VERINT
POWERING ACTIONABLE INTELLIGENCE®

Nextiva S1100w User Guide

Firmware Release 4.12

August 2007

Nextiva S1100w

Firmware Release 4.12

User Guide

Verint Video Intelligence Solutions **Revision: A**

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www.verint.com/videosolutions

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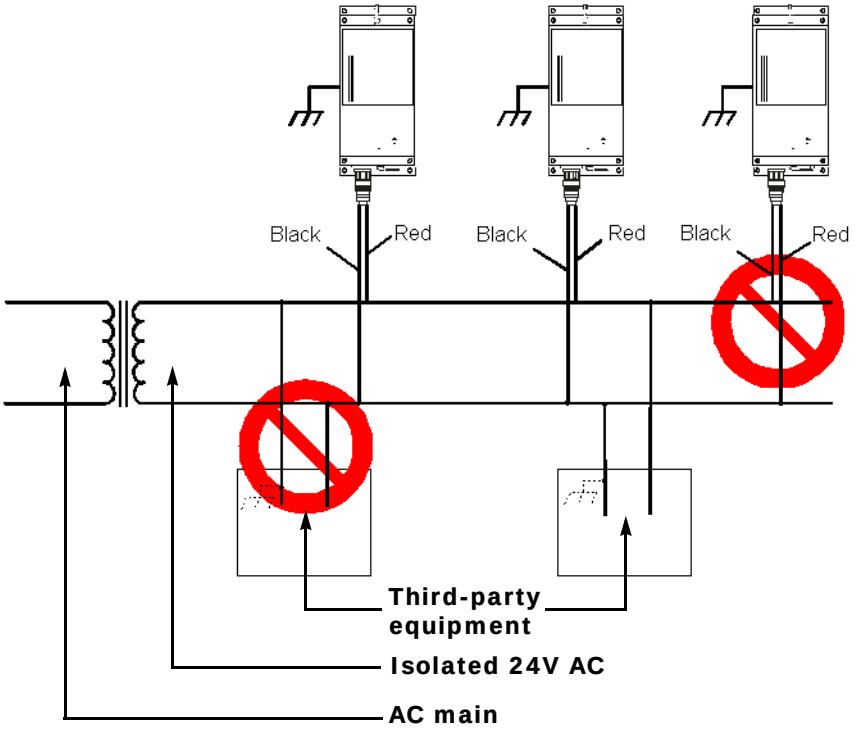
Warning: If you connect multiple devices on the same 24V AC power supply, always wire them the same way: The red power wires of all devices must be on the same power supply terminal. Since the black power wire of the device is internally connected to its chassis (earth), swapping the power connection scheme from device to device will short out the AC power supply.

Warning: You can install third-party equipment with an earth-referenced power input on the same power source as the devices. To do so, you must connect the earth-referenced terminal of the equipment to the same AC terminal as the black wire of the devices. Failing to do so will short out the AC power supply.



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Preface

The *Nextiva S1100w User Guide* presents the information and procedures for installing, configuring, and using the Nextiva™ S1100w wireless video transmitters.

Who Should Read this Guide

This guide is intended for managers, IT system administrators, engineers, and technicians who will use the S1100w edge devices. It provides conceptual information on how to configure, install, and operate the devices.

This guide assumes that you are familiar with:

- Installation and manipulation of electronic equipment
- General use of computers
- Local area networks (LANs) and basic IP data communication concepts and practices
- Radio frequency (RF) platforms
- 801.11 networks if the 802.11 MAC mode is used
- Pan-tilt-zoom (PTZ) platforms (cameras and keyboards)
- Microsoft Windows operating systems

How to Use this Guide

This guide contains all the information needed to install, configure, and use an S1100w device.

Conventions

The following typographic conventions are used throughout this guide:

Visual cue	Meaning
Connect	The name of an interface element you have to act on. A key to press. The value of an interface element.
connection_name	Text that must be replaced by a user-supplied value. Text representing variable content.
`SConfigurator.exe`	The name of a command, file, or directory. Text that appears on the screen. Examples of user-supplied values.

Related Documentation

In addition to this guide, the following documentation is also available:

- *Nextiva S1100w Installation Guide*
- *SConfigurator User Guide*
- *Release Notes*

All these documents are contained on the *Utilities* CD shipped with the device. Furthermore, a paper copy of the installation guide is included with your order.

Related Products

You use the S1100w devices with the Nextiva S3100 multipurpose outdoor access point. You may also use them with the nDVR™ and Nextiva enterprise management and storage solutions. For more details about any of these products, visit our web site. For pricing information, call your dealer.

About Us

Verint® Systems Inc. (NASDAQ: VRNT) is a leading global provider of analytic software-based solutions for security and business intelligence. Verint solutions help organizations make sense of the vast voice, video, and data available to them, transforming this information into actionable intelligence for better decisions and highly effective performance.

Since 1994, Verint has been committed to developing innovative solutions that help global organizations achieve their most important objectives. Today, organizations in over 50 countries use Verint solutions to enhance security, boost operational efficiency, and fuel profitability.

Web Site

For information about the Nextiva line of products, visit www.verint.com/videosolutions.

To request the latest versions of firmware and software or to download other product-related documents, you need access to the Verint Video Intelligence Solutions partner extranet. To register, go to http://vvs.verint.com.

Support

If you encounter any type of problem after reading this guide, contact your local distributor or Verint representative. You can also use the following sections on the partner extranet to find the answers to your questions:

- Knowledge Base
- FAQ
- My Account

For assistance with the Nextiva edge devices and the related software, contact the customer service team:

- By phone: 1 888 747-6246 or 631 962-9202
- By email: vvssupport@verint.com

Warranty

Each product manufactured by Verint Systems is warranted to meet all published specifications and to be free from defects in material and workmanship for a period of two (2) years from date of delivery as evidenced by the Verint Systems packing slip or other transportation receipt. Products showing damage by misuse or abnormal conditions of operation, or which have been modified by Buyer or repaired or altered outside Verint Systems factory without a specific authorization from Verint Systems shall be excluded from this warranty. Verint Systems shall in no event be responsible for incidental or consequential damages including without limitation, personal injury or property damage.

The warranty becomes void if the product is altered in any way.

Verint Systems responsibility under this warranty shall be to repair or replace, at its option, defective work or returned parts with transportation charges to Verint Systems factory paid by Buyer and return paid by Verint Systems. If Verint Systems determines that the Product is not defective within the terms of the warranty, Buyer shall pay all handling and transportation costs. Verint Systems may, at its option, elect to correct any warranty defects by sending its supervisory or technical representative, at its expense, to customer's plant or location.

Since Verint Systems has no control over conditions of use, no warranty is made or implied as to suitability for customer's intended use. There are no warranties, expressed or implied, except as stated herein. This limitation on warranties shall not be modified by verbal representations.

Equipment shipped ex works Verint Systems factory shall become the property of Buyer, upon transfer to the common carrier. Buyer shall communicate directly with the carrier by immediately requesting carrier's inspection upon evidence of damage in shipment.

Buyer must obtain a return materials authorization (RMA) number and shipping instructions from Verint Systems prior to returning any product under warranty. Do not return any Verint Systems product to the factory until RMA and shipping instructions are received.

1

Overview

The S1100w allows digital video transmission over license-free and licensed bands. It delivers high-quality MPEG-4-based video at 30 frames per second in NTSC (25 in PAL) over local and wide area networks (LANs and WANs). This wireless edge device is built on open standards to provide long-term investment protection.

Combined with a Nextiva S3100 multipurpose outdoor wireless device or a commercial 802.11 access point, the S1100w enables analog CCTV extension over the enterprise's network at a cost lower than that of laying new cables. The S1100w also allows the migration of analog CCTV cameras to an IP network.

Note: The S1100w edge devices require professional installation.

About the S1100w

The S1100w devices come as transmitters only. You can buy 12V DC or 24V AC devices.

The S1100w covers the 2.4 GHz and 5 GHz frequency bands in North America and Europe. It also covers the 4.9 GHz public safety band in North America.

Unless otherwise specified, the word *S1100w* refers to any of these devices.

Each device is configured to operate, right out of the box, with the most popular camera data port configuration (4800 baud, 8 data bits, no parity, 1 stop bit).

Security

Every S1100w device comes with the following security features:

- SSL—Every edge device is shipped with a unique SSL (Secure Sockets Layer) certificate for securing its IP link. SSL is a commonly used protocol for managing the security of IP message transmission. Therefore, the connections with another device or the SConfigurator tool can be secured.

  If enabled, the SSL protocol secures the VSIP communication data. It does not apply to audio and video transmission.

  Once a device is in secure mode, you cannot access it anymore with Telnet and you cannot perform firmware updates through the IP network on it. However, you can configure it with SConfigurator.

  For more information about this security feature, refer to the *SConfigurator User Guide*.

- SPCF (SmartSight Point Coordination Function)—This proprietary MAC (Media Access Control) protocol using AES encryption (with key rotation) over the wireless link to secure communication between the devices and resolve “hidden node,” quality of service, range, and problems inherent to 802.11 wireless networking products. SPCF secures VSIP communication as well as the audio and video data.

Video

The S1100w has one video input with two encoders.

The video frame rate of the edge device can be:

- NTSC—1 to 7, 10, 15, or 30 frames per second (fps)
- PAL—1 to 6, 8, 12, or 25 fps

The S1100w devices can have the following video resolutions and maximum frame rates (in frames per second), using the *NTSC (PAL)* format:

Resolution	Number of columns	Number of lines		Maximum frame rate	
	NTSC/PAL	NTSC	PAL	NTSC	PAL
QCIF	176	128	144	30	25
CIF	352	240	288	30	25
2CIF	352	384	448	30	25
2CIFH	704	240	288	30	25
4CIF	704	480	576	15	12
All lines	352	480	576	30	25
2/3 D1	480	480	576	15/30 *	12/25 *
VGA	640	480	576	15/30 *	12/25 *

* Without noise, I/Os, and other factors affecting quality, the device can achieve the highest frame rate.

For more information about these video parameters, refer to the *SConfigurator User Guide*.

Shipment

Your S1100w shipment contains the following items:

- The requested transmitter, which comes with an integrated patch antenna (with a gain of 8.5 dBi in the 2.4 GHz band or 13 dBi in the 4.9 and 5 GHz bands)
- A wall mount bracket set, already installed on the device
- A pole mount bracket set, including stainless steel clamps
- A cable assembly for video, power, and serial port (*CAB9P*)
- The *Utilities* CD containing the release notes and documentation for the device as well as the SConfigurator application
- The *Nextiva S1100w Installation Guide*

The shipment may also contain the following options:

- A high-gain antenna

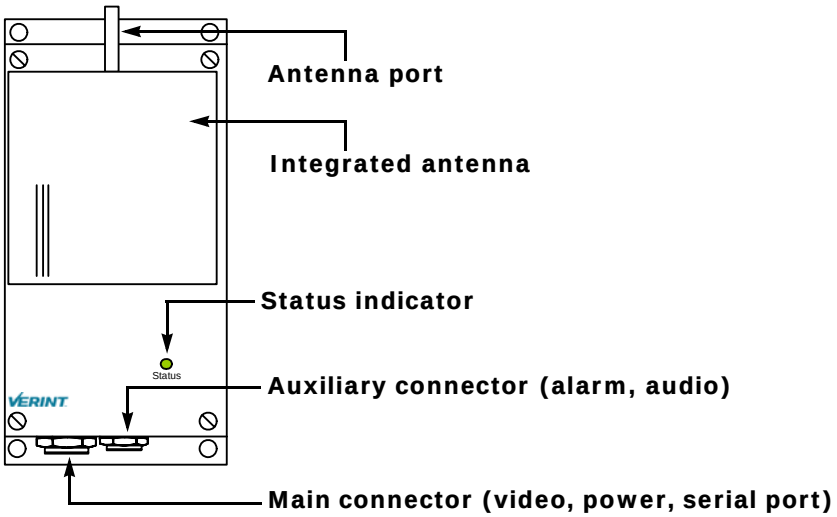
  Warning: When choosing an antenna, you must ensure that the combined transmission power of the device and antenna does not exceed the maximum value established by your country's regulations. For more information, see page 19.

- A junction box (*JBOX*)
- An alarm/audio cable assembly (*CAB8P*)
- A power supply

  Note: If you are using a power supply other than those supplied by Verint, you need to ensure that they have a minimum capacity of 1A (for 12V DC) or 30 VA (for 24V AC).

Casing Description

The S1100w electronics are enclosed in a weather-tight cast aluminum module. All cable entries are mounted on the underside of the module to maintain its weatherproof properties. The front panel integrates one bicolor visual indicator that illustrates the operational state of the device.



2

System and RF Planning

To allow optimal configuration, you must properly plan your network, especially RF (radio frequency) and configuration layout.

Frequency Bands and Channels

The S1100w supports communications in the following frequency bands, in North America and Europe:

- 2.4 GHz OFDM, also known as 802.11g
- 4.9 GHz OFDM, a public safety band available in North America only
- 5 GHz OFDM, also known as 802.11a

2.4 GHz Band

The 2.4 GHz band provides 11 channels in North America and 13 in Europe. In these two regions, only channels 1, 6, and 11 are independent (that is, non-overlapping). All these channels are for indoor or outdoor use. The center frequencies of the channels are:

Channel	Frequency (GHz)	Channel	Frequency (GHz)
1	2.412	8	2.447
2	2.417	9	2.452
3	2.422	10	2.457
4	2.427	11	2.462
5	2.432	12	2.467 (Europe only)
6	2.437	13	2.472 (Europe only)
7	2.442		

4.9 GHz Band

The 4.9 GHz band is a licensed band for entities providing public safety services focused on the protection of life, health, or property in North America. This band provides license holders with an interference-free, secure channel for robust and secure broadband technologies, including wireless video surveillance systems.

For more detailed information concerning the regulations governing licensing and use of frequencies in the 4.9 GHz band, see Subpart Y of the FCC document, Memorandum Opinion and Order and Third Report and Order at:

http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-03-99A1.pdf

The 4.9 GHz band has a width of 50 MHz (4940 to 4990 MHz). Since the standard channel width is 20 MHz, only two independent channels can co-exist in the band. However, the S1100w supports channel fragmentation, allowing narrower channels of 5 MHz and 10 MHz. You can have up to four independent channels with a 10 MHz width, and up to 10 with a 5 MHz width. All these channels are for indoor or outdoor use. For more information about channel fragmentation, see page 45.

The available channels are:

Channel	Frequency (GHz)	Channel width
3	4.9425	5 MHz
6	4.9475	5 MHz
7	4.9525	5 MHz or 10 MHz
7	4.950	20 MHz
8	4.9575	5 MHz
9	4.9625	5 MHz or 10 MHz
10	4.9675	5 MHz
11	4.9725	5 MHz or 10 MHz
11	4.970	20 MHz
12	4.9775	5 MHz
13	4.9825	5 MHz or 10 MHz
16	4.9875	5 MHz

5 GHz Band

In the 5 GHz band, the number of available channels and sub-bands vary depending on the country of operation.

Most European countries adhere to the DFS (Dynamic Frequency Selection) and TPC (Transmit Power Control) regulations established by the European Telecommunications Standards Institute (ETSI); these regulations apply to the 5 GHz frequency band only. To know which bands are available in your country of operation and whether your country adheres to DFS and TPC, refer to the *Wireless Frequency Plan* document located on the Verint Video Intelligence Solutions extranet (Technical Support, then Downloads, then Utilities and Tools).

In North America, five channels are available in the 5 GHz band, all independent and for indoor or outdoor use. The center frequencies of these channels are:

Channel	Frequency (GHz)
149	5.745
153	5.765
157	5.785
161	5.805
165	5.825

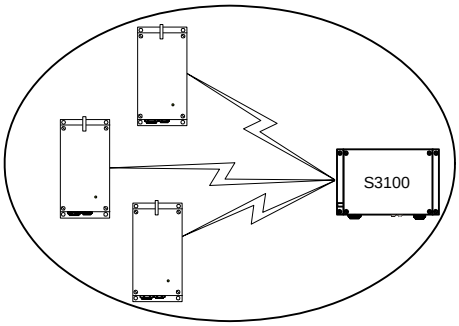
In Europe, the 11 independent channels, for indoor or outdoor use, are:

Channel	Frequency (GHz)	Channel	Frequency (GHz)
100	5.50	124	5.62
104	5.52	128	5.64
108	5.54	132	5.66
112	5.56	136	5.68
116	5.58	140	5.70
120	5.60		

Wireless Cells

A wireless network is designed such that information can travel back and forth between two points without the need for wires. For the S1100w, this information consists of digitized video, audio, and PTZ data sent to and from the wired network via an outdoor wireless access point—either the Nextiva S3100 device or a commercial 802.11 access point.

A wireless cell consists of a group of wireless devices that communicate together on the same frequency channel and that share the same wireless passkey (described on page 42). For example:



You can colocate many wireless cells if you respect certain conditions (see page 13).

802.11 Support

Starting at firmware version 4.0, you can use the S1100w devices with commercial 802.11-compliant access points. To support this new protocol, the *802.11* MAC (Media Access Control) mode is introduced. This mode is available in all frequency bands (2.4 GHz, 4.9 GHz, and 5 GHz).

The S1100w in 802.11 mode supports the following security mechanisms:

- No security—Not recommended
- WEP—Not recommended
- WPA and WPA2 (also known as *802.11i*) in personal mode (PSK)
- WPA and WPA2 in Enterprise mode, with an 802.1X authentication server

Note: WPA and WPA2 are not available with the proprietary SPCF MAC mode.

The supported authentication methods for WPA and WPA2 are:

Method	Authentication means	Remarks
PSK—Pre-Shared Key (personal)	passphrase	Designed for home and small office networks. A passphrase is required to connect to an access point and therefore access the network.
EAP-TLS (Enterprise)	login/password and certificate	Uses mutual authentication. The most secure option available.
EAP-TTLS (Enterprise)	login/password and certificate	Creates a secure TLS tunnel. Supports MSCHAPv2 (the Microsoft version of the Challenge Handshake Authentication protocol) to validate logins and passwords. A certificate is required on the server side.
PEAP (Enterprise)	login/password and certificate	Creates a secure TLS tunnel. Supports MSCHAPv2 (the Microsoft version of the Challenge Handshake Authentication protocol) to validate logins and passwords. A certificate is required on the server side.

For more information about the TLS (Transport Layer Security) protocol, refer to RFC 2246 at http://www.ietf.org/rfc/rfc2246.txt.

The supported encryption methods are:

- WEP
- AES-CCMP
- TKIP
- Auto-select—The device automatically chooses the best available encryption scheme.

The wireless parameters associated to 802.11 differ from those of the SPCF mode. For more information about these parameters, see page 41 for the command line interface or refer to the *SConfigurator User Guide*.

Be aware of the following limitations in using S1100w devices in a 802.11 environment:

- The S1100w will not be able to connect itself to an S3100.
- The inherent problems with 802.11 wireless network products, such as the “hidden node” and quality of service issues, will be present. Furthermore, the ranges of the equipment will be lower than with the SPCF protocol.

It is assumed that the network administrators wanting to add S1100w transmitters to their 802.11 wireless network are knowledgeable about this protocol. In the remaining of this user guide, the access point will be a Nextiva S3100 using the SPCF protocol.

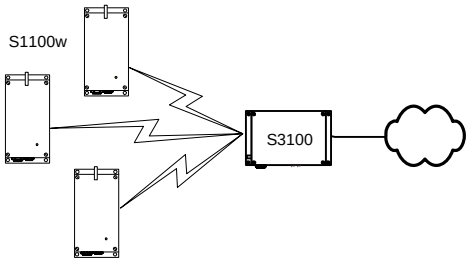
System Planning

When installing many wireless systems in the same area, you have to carefully plan their positions in order to prevent radio interference and select the appropriate antennas.

The grouping of devices in each wireless cell is determined by their respective locations with respect to one another and by the available outdoor wireless access points. As a rule of thumb, there should be a clear RF line of sight between each S1100w device and the access point in each cell. However, the S1100w devices can be completely hidden from one another.

Point-to-Multipoint Application

A point-to-multipoint application is a wireless cell made up of an S3100 access point (the *master*) and several S1100w transmitters (the *clients*). Here is a typical point-to-multipoint system:



For example, to associate three S1100w devices to one access point, you need to:

1. Assign the same wireless passkey to the S1100w devices and the S3100 access point. The wireless passkey must be different from that of other colocated cells, if any.
2. In a non-DFS context, assign a frequency channel to the S3100 device. In a DFS context, the master device will automatically select a channel.

   The associated S1100w devices will automatically use their master's channel.
3. Install the S1100w devices such that each one has a clear RF line of sight with the S3100 access point.

For the configuration and installation procedure, see page 23.

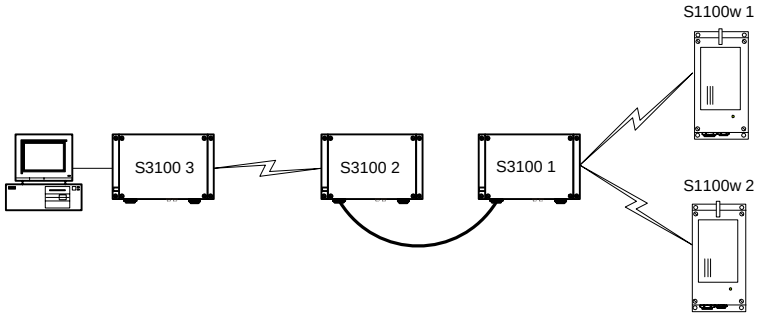
Compatibility Issues

When planning your wireless systems, you have to take into account the firmware versions of the involved devices. It is recommended that the S1100w transmitters have the same firmware versions as their associated master; however, from version 2.60 and up, the devices are fully compatible (for example, an S1100w at version 4.0 with an S3100 at version 3.62).

In a wireless cell, the order in which you configure the devices (either the first time or later when they are installed in the field) or update their firmware is critical if you do not want to lose access to them. You should then:

- Update the devices starting with the farthest (in terms of number of RF hops) from the computer running the upgrade procedure.
- One step at a time, get closer to the computer.

For example, consider the following setup:



You should update the devices in the following order:

1. S1100w 1—You then lose contact with S1100w 1.
2. S1100w 2—You then lose contact with S1100w 2.
3. S3100 1—You can then reach all devices.
4. S3100 2—You then lose contact will all devices except master S3100 3.
5. S3100 3—You can then reach all devices.

For the complete firmware update procedure, refer to the documentation of the Verint software you are using.

Video Bit Rate and Data Throughput

You can theoretically connect up to 16 S1100w devices to a master access point in a wireless cell. In practice however, video quality, frame rate, and system layout can limit the number of devices that a single master access point can support.

Each time multiple client devices are connected to a master S3100, the available bandwidth is divided equally between the connections. For example, three S1100w clients connected to a master on a 6 Mbps link each have 2 Mbps throughput.

Video quality and frame rate influence the required data throughput. Therefore, you need to carefully plan the number of cameras that will work on a link.

The following figures were measured in typical setup situations. They may vary depending on your configuration. The total data throughput in a unidirectional UDP link setup varies depending on the frequency channel width: 20 MHz in all available bands, or 5 MHz and 10 MHz in the 4.9 GHz frequency band.

The throughput for a 20 MHz channel is:

Physical bit rate	Throughput for a 3 mile (5 km) distance	Throughput for a 9.3 mile (15 km) distance	Throughput for a 15.5 mile (25 km) distance
6 Mbps	3.5 Mbps	3.4 Mbps	3.3 Mbps
9 Mbps	4.7 Mbps	4.5 Mbps	4.4 Mbps
12 Mbps	5.6 Mbps	5.4 Mbps	5.2 Mbps
18 Mbps	7.0 Mbps	6.6 Mbps	6.3 Mbps
24 Mbps	8.1 Mbps	7.5 Mbps	7.1 Mbps

Physical bit rate	Throughput for a 3 mile (5 km) distance	Throughput for a 9.3 mile (15 km) distance	Throughput for a 15.5 mile (25 km) distance
36 Mbps	9.1 Mbps	8.6 Mbps	8.1 Mbps
48 Mbps	10.0 Mbps	9.3 Mbps	8.7 Mbps
54 Mbps	10.1 Mbps	9.5 Mbps	9.0 Mbps

The throughput for a 10 MHz channel is:

Physical bit rate	Throughput for a 3 mile (5 km) distance	Throughput for a 9.3 mile (15 km) distance	Throughput for a 15.5 mile (25 km) distance
3 Mbps	2.0 Mbps	1.9 Mbps	1.9 Mbps
4.5 Mbps	2.8 Mbps	2.7 Mbps	2.7 Mbps
6 Mbps	3.5 Mbps	3.4 Mbps	3.3 Mbps
9 Mbps	4.5 Mbps	4.4 Mbps	4.3 Mbps
12 Mbps	5.4 Mbps	5.1 Mbps	5.0 Mbps
18 Mbps	6.7 Mbps	6.3 Mbps	6.0 Mbps
24 Mbps	7.4 Mbps	7.1 Mbps	6.8 Mbps
27 Mbps	7.7 Mbps	7.4 Mbps	7.0 Mbps

The throughput for a 5 MHz channel is:

Physical bit rate	Throughput for a 3 mile (5 km) distance	Throughput for a 9.3 mile (15 km) distance	Throughput for a 15.5 mile (25 km) distance
1.5 Mbps	1.1 Mbps	1.1 Mbps	1.1 Mbps
2.25 Mbps	1.5 Mbps	1.5 Mbps	1.5 Mbps
3 Mbps	1.9 Mbps	1.9 Mbps	1.8 Mbps
4.5 Mbps	2.6 Mbps	2.6 Mbps	2.5 Mbps
6 Mbps	3.2 Mbps	3.2 Mbps	3.1 Mbps
9 Mbps	4.2 Mbps	4.1 Mbps	3.9 Mbps
12 Mbps	4.9 Mbps	4.7 Mbps	4.6 Mbps
13.5 Mbps	5.1 Mbps	5.0 Mbps	4.8 Mbps

The S1100w automatically adjusts the transmission speed with the current RF conditions.

For the bit rate requirements of the edge devices to which the cameras are connected, consult the *Bit Rate Settings for Video Servers* document located on the Verint Video Intelligence Solutions extranet (Technical Support, then Downloads, then Utilities and Tools).

TPC

If the country of operation of the S1100w device requires conformity to the TPC (Transmit Power Control) regulations, the transmission power of its radio is automatically reduced by 3 dB before leaving the Verint factory. However, in case of a weak wireless link (that is, a link with an RF margin of less than 15 dB), you have the opportunity to use the maximum transmission power (see page 46).

DFS

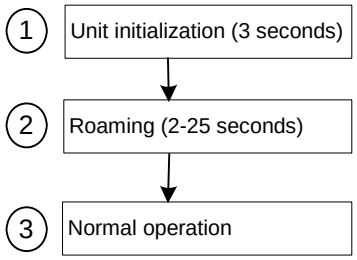
To follow the DFS (Dynamic Frequency Selection) regulations specified by ETSI for the selected country, it is the master S3100 device that performs the tasks relative to frequency channel selection and radar detection. In other words, you cannot choose the frequency channel on which the edge device will run.

The automatic selection of the frequency channel limits the number and the configuration of the wireless cells. Furthermore, when colocating many cells, all masters must “see” each other.

Note: DFS is required only in the 5 GHz band.

You should start the master first, then power the client when the other device is in normal operation.

The boot sequence of client (transmitter) devices is:



1. The device goes through the standard startup procedure.
2. The device roams through the channels in the available frequency bands to locate its master.
3. When the master is located, the client device runs normally on the selected frequency channel.

Colocated Cells

You can operate many wireless cells in the same location, provided you follow guidelines relative to frequency channel, wireless passkey, and distance.

Regarding frequency channel, you cannot manually select one in the 5.40–5.725 GHz band in Europe; for the detailed procedure, see page 16.

The wireless passkeys of colocated cells must be different from one another, regardless of their frequency channels.

Distance Limitations

The distance limitations between devices are:

- The minimum distance between two devices is 3 feet (1 meter), regardless of the band or channel used.
- To avoid material damages, you must never power any two devices while their antennas are facing one another with a distance of less than 10 feet (3 meters).
- If using adjacent channels, see page 65 for the recommendations on the minimum distances to respect.
- To reduce radio interference possibilities between two adjacent frequency channels, ensure that the maximum margin between the emission of the two wireless cells is 25 dB; for more information, see Appendix F on page 65.

4.9 GHz Band in North America

Depending on the channel width (20, 10, or 5 MHz), you can colocate 2, 4, or 10 wireless cells respectively. For the available channels in each of the three scenarios, see page 7.

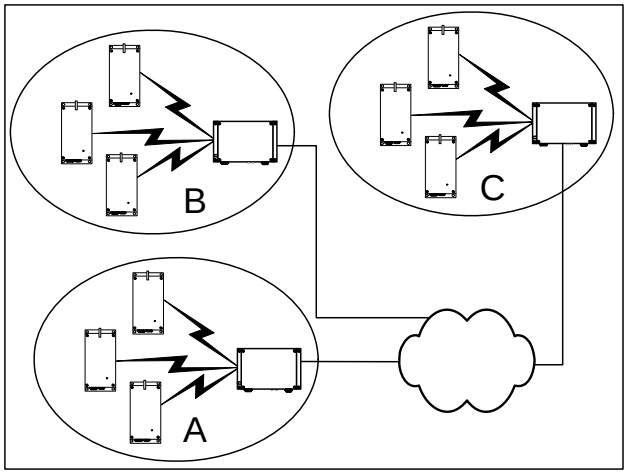
The following example presents three wireless cells with 10-MHz channels. To install such a system, you have to:

1. In each cell, assign the same wireless passkey to the S1100w devices and the S3100 access point. The wireless passkey must be different from that of the other cells.
2. Assign a different frequency channel to each S3100 device; the associated S1100w devices will automatically use their master's channel:

Device	Cell	Channel	Wireless Passkey
S3100_A	A	7	ertynmbvcxzapoiu
S1100w_A1	A	7	ertynmbvcxzapoiu
S1100w_A2	A	7	ertynmbvcxzapoiu
S1100w_A3	A	7	ertynmbvcxzapoiu
S3100_B	B	13	PUK98rewq4123qzx
S1100w_B1	B	13	PUK98rewq4123qzx
S1100w_B2	B	13	PUK98rewq4123qzx
S1100w_B3	B	13	PUK98rewq4123qzx
S3100_C	C	11	987123jkl456wert
S1100w_C1	C	11	987123jkl456wert
S1100w_C2	C	11	987123jkl456wert
S1100w_C3	C	11	987123jkl456wert

3. In each cell, install the S1100w devices such that each one has a clear RF line of sight with its associated S3100 access point.

This application can be illustrated this way, where the three cells are in the same location:



5 GHz Band in North America and 2.4 GHz

In the 2.4 GHz band in North America and Europe, you can use the three independent channels (channels 1, 6, and 11) to colocate wireless cells. In the 5 GHz band, all channels are independent.

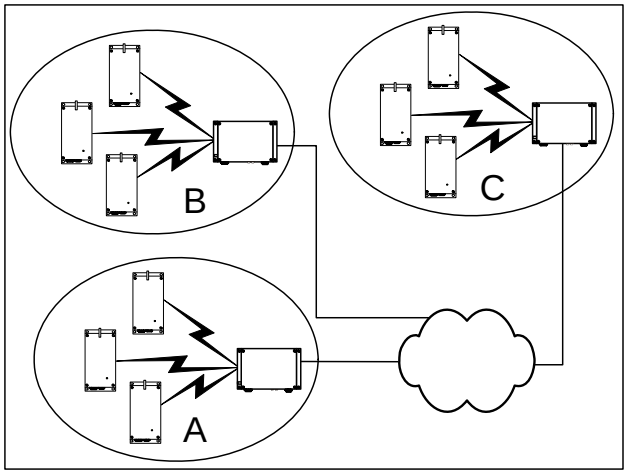
A typical colocation example is three wireless cells. To install such a system, you have to:

1. In each cell, assign the same wireless passkey to the S1100w devices and the S3100 access point. The wireless passkey must be different from that of the other cells.
2. Assign a different frequency channel to each S3100 device; the associated S1100w devices will automatically use their master's channel. For example, in the 5 GHz band:

Device	Cell	Channel	Wireless Passkey
S3100_A	A	149	ertynmbvcxzapoiu
S1100w_A1	A	149	ertynmbvcxzapoiu
S1100w_A2	A	149	ertynmbvcxzapoiu
S1100w_A3	A	149	ertynmbvcxzapoiu
S3100_B	B	165	PUK98rewq4123qzx
S1100w_B1	B	165	PUK98rewq4123qzx
S1100w_B2	B	165	PUK98rewq4123qzx
S1100w_B3	B	165	PUK98rewq4123qzx
S3100_C	C	157	987123jkl456wert
S1100w_C1	C	157	987123jkl456wert
S1100w_C2	C	157	987123jkl456wert
S1100w_C3	C	157	987123jkl456wert

3. In each cell, install the S1100w devices such that each one has a clear RF line of sight with its associated S3100 access point.

This application can be illustrated this way, where the three cells are in the same location:



5 GHz Band in Europe

The maximum number of colocated cells corresponds to the number of channels in the available frequency bands that can be used outdoors. For instance, in most countries of Western Europe, you can have up to 11 colocated cells in the 5.40–5.725 GHz band. However, because the master devices must see each other in a DFS context, the variety of supported setups is limited.

In this context, you can easily install up to five cells. By respecting the following steps, you can assume that the cells will not share the same frequency channel, making the complete bandwidth available for each one. You have to:

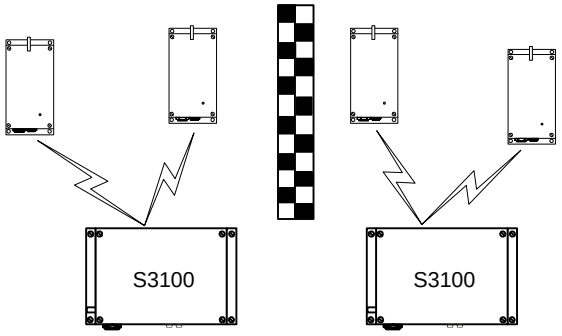
1. Assign a different wireless passkey to each cell.
2. Ensure that all masters “see” one another. For more information, refer to the “RF Contact between Masters” appendix in the *Nextiva S3100 Series User Guide*.
3. Position the devices so that there is at least 3 feet (1 meter) between each antenna.
4. In each master device, set a different starting order: 1 for the first device, 2 for the device next to it, 3 for the third one, and so on.

Installing more than five cells in the 5.40–5.725 GHz band requires the use of adjacent channels. This situation demands greater distances between the antennas to reduce potential radio interference. Therefore, you should contact the Verint Video Intelligence Solutions project engineering group for assistance.

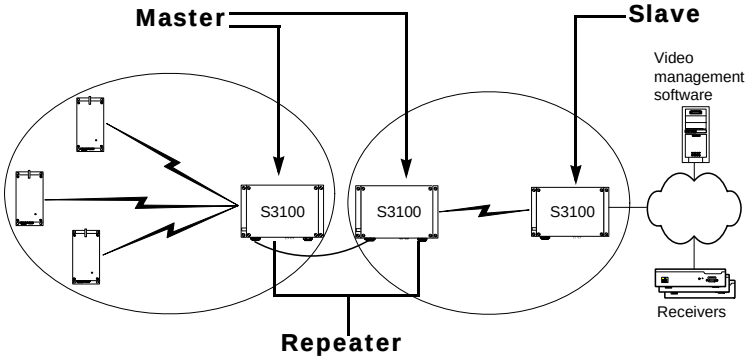
Supported Setups

The following colocated systems are supported in the 5.40–5.725 GHz band:

- Two access point applications, in which the transmitters from one system do not see the transmitters from the other cell. Both master devices see each other.



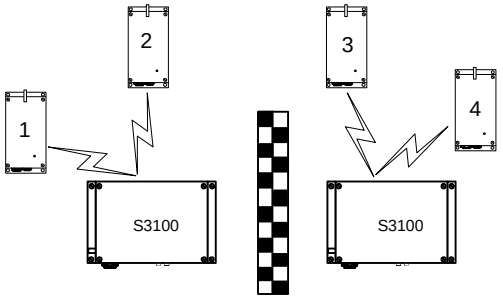
- A point-to-multipoint repeater. Both master devices see each other.



Unsupported Setup

You cannot install the following colocated system in the 5 GHz band in Europe:

- Access point applications with hidden masters. In this context, the two S3100 masters do not see each other, while transmitters 2 and 3 do.



RF Planning

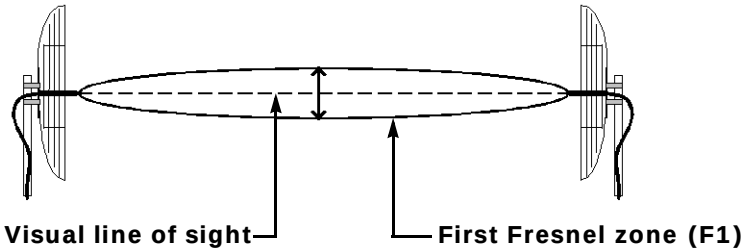
Successful operation of a wireless link depends on proper RF path planning and antenna installation. You have to install the devices in such a way that there is a clear RF line of sight between the two antennas.

Location Evaluation

The path between the two antennas must be free of obstacles that could disturb propagation. For very short link distances—less than 500 feet (152 meters)—you may be able to establish a working link despite partial path obstruction. However, radio waves will be in part absorbed and in part diffracted by the obstacles, therefore affecting link reliability. Because the reliability of such an installation is highly unpredictable, Verint does not recommend it. A path free of any obstacle is called an *RF line-of-sight path*.

To establish an RF line-of-sight path, you must take into account the beam width of the radio signal transmitted between the two antennas. This beam width is an elliptical area immediately surrounding the visual line of sight. It varies in thickness depending on the length of the line of sight; the longer the length, the thicker the beam width becomes.

The region outlined by the signal beam width is known as the *first Fresnel zone*. The Fresnel zone is always thicker at the mid-point between the two antennas. Therefore what appears to be a perfect line-of-sight path between the base and a remote station may not be adequate for a radio signal; this is the difference between “visual” and “RF” line of sight.



In practice, it has been determined that a radio path can be considered an RF line-of-sight path if it has a clear opening through 60% of the first Fresnel zone (or *0.6 F1*). Here are values for 0.6 F1 for various signal path distances and frequency bands:

Distance (mi./km)	2.45 GHz (feet/m)	4.9 GHz (feet/m)	5.3 GHz (feet/m)	5.8 GHz (feet/m)	Earth curvature effect (feet/m)
1 / 1.6	14 / 4.2	9.8 / 3.0	9.5 / 2.9	8.9 / 2.7	0
4 / 6.5	27 / 8.4	19.5 / 5.9	18.7 / 5.7	18 / 5.5	2 / 0.6
7 / 11.3	37 / 11	25.8 / 7.9	25 / 7.6	23.6 / 7.2	6 / 1.8
15 / 24	53 / 16	37.8 / 11.5	36.4 / 11.1	35 / 10.6	29 / 8.8

For distances under seven miles, the earth curvature effect is negligible. However, for greater distances, you need to consider it in your calculations; for instance, for a 15-mile link in the 2.4 GHz band, the two antennas must be located 82 feet higher than the highest obstacle in the RF line of sight between them (that is, 53 feet for the Fresnel zone plus 29 feet for the earth curvature effect). For help, consult the Verint Video Intelligence Solutions Support group.

A common problem encountered in the field and related to the 0.6 F1 clearance rule is building obstruction. The proposed visual path may just barely clear a building but the RF line of sight will not. In such a case, the signal will be partially absorbed and diffracted. Increasing the height of the two antennas or the gain of the antennas are the only alternatives to improve the link quality.

Note: At 2.4, 4.9, and 5 GHz, radio waves are highly attenuated by dense foliage. A link established in the fall or winter season may be adversely affected in the spring and summertime, if it is established below tree level.

Antenna Requirements

Verint offers many antennas to meet various distance requirements. You need to consider many factors when choosing an antenna, including the distance to cover, the RF bit rate, the radiated power (EIRP), and the frequency band. For systems located in North America on the 5 GHz band, you can use the *Wireless System Margin Calculator* located on the Verint Video Intelligence Solutions extranet (Technical Support, then Downloads, then Utilities and Tools).

The combined transmission power of the device and antenna must not exceed the maximum value established by your country's regulations. To ensure that this maximum is not exceeded, enter the gain of the chosen antenna in the CLI (Wireless Communication menu) or SConfigurator (Wireless pane). The device will automatically take it into account and adjust its own transmission power accordingly at startup.

Note: Connecting an antenna with a gain higher than the calculated value contravenes your country's regulations. It is your responsibility to ensure that you respect the regulations in place.

The maximum antenna gain supported to meet local regulations are:

Location	Band	Antenna gain
Europe	2.4 GHz	8.5 dBi
	5 GHz	13 dBi
North America	2.4 GHz	8.5 dBi
	2.4 GHz	16 dBi
	4.9 GHz	13 dBi
	5 GHz	18 dBi

The antennas certified by Verint are:

- ANT-WP8-24/S: 8.5 dBi gain, 2.4 GHz band, 65° beamwidth, patch antenna with 3-foot (1-meter) SMA-SMA cable
- ANT-WP13-5x/S: 13 dBi gain, 5.25-5.85 GHz band, 40° beamwidth, patch antenna SMA/F connector
- ANT-WP13-49-5x/S: 13 dBi gain, 4.9-5.85 GHz band, 40° beamwidth, patch antenna SMA/F connector
- ANT-WP16-24/S: 16dBi gain, 2.4 GHz band, 27° beamwidth, patch antenna with 3-foot (1-meter) SMA-N cable
- ANT-WP18-5x/S: 18 dBi gain, 5.25-5.85 GHz band, 18° beamwidth, patch antenna with 3-foot (1-meter) SMA-N cable

Interference

In most countries, the 2.4 GHz band is not regulated by a government agency; this absence of frequency coordination can result in interference between various systems. For instance, if a link with an RF line of sight is subject to excessive video delay and very low frame rate (or possibly breakdown of video images), it could be due to interference. Fortunately, you have ways of adapting your setup to avoid interference:

- RF channel selection—The S1100w has 11 or 13 channels to choose from. In case of interference, it is recommended to change channel until you find a clean one.
- Antenna selection—Replacement of the integrated antenna by a higher gain one can significantly lower the interference from other radio systems. Replace the antenna if switching channels does not correct the problem or if all channels must be used to colocate several systems.

There should not be any interference in the 4.9 GHz band, since it is a licensed band with limited usage to public safety.

The 5 GHz band is less cluttered than the 2.4 GHz band, resulting in less potential interference from other wireless systems.

RF Exposure Considerations

In order to comply with the RF exposure requirements of CFR 47 part 15 in North America, the devices must be installed in such a way as to allow a minimum separation distance of 12 inches (30 cm) between antennas and persons nearby.

3

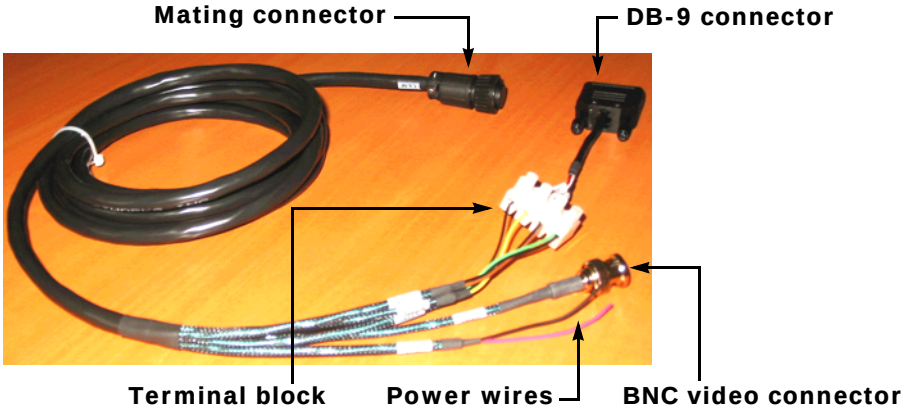
Configuring and Installing the Device

The steps required to prepare your S1100w device for operation are:

- Basic configuration
- Physical installation in its final location
- Alarm and audio configuration

Cable for Power, Video, and Serial Data

The supplied CAB9P cable assembly is used for video, power, and serial port connection.



For the detailed pinout, see page 54.

Serial Port

The S1100w integrates one multipurpose serial port. This port is used for system configuration and data communication: pan-tilt-zoom (PTZ), access control, or other. By default, the port automatically detects if it is connected to an RS-232 or RS-422/485 serial device.

The CAB9P cable is supplied with a female DB-9 plug enabling RS-232 connections. However, most PTZ cameras, keyboards, and similar devices use RS-422/485 connections. Therefore, you will have to adapt the CAB9P cable for its different uses:

- During the configuration process of the S1100w, you need to access a computer, so the DB-9 connector is required for RS-232 communication.
- Later, when installing the device in its final location, you will likely want to connect it to RS-422/485 equipment, therefore requiring changes on the cable. You should keep the DB-9 connector on the cable for later use.

Warning: At any time there must be only one serial device connected to the S1100w device. For instance, when configuring the device, you must unplug any RS-422/485 device.

Power

Use the red and black wire pair of the CAB9P cable to connect the S1100w device to an external power supply.

To power an S1100w device:

1. In 12V DC, the red wire is for input and the black wire is for power ground.
   a. Twist together the black power wire of the cable and the wire with the dashed white lines of the supplied power supply.
   b. Twist together the red power wire of the cable and the other power supply wire.
2. In 24V AC, both wires are used for power. Connect the two power wires of the cable to the screws labelled 1 and 3 on the power supply; it does not matter which wire goes on which screw.

Configuring the Wireless System

The configuration steps to execute are:

- Set a series of parameters
- If required, establish a point-to-point connection between the transmitter and a receiver

To configure the device, you need the proprietary SConfigurator tool. It is included on the *Utilities* CD shipped with your device; you can also find its latest version on the Verint Video Intelligence Solutions extranet (Technical Support, then Downloads, then Utilities and Tools). You have to copy its executable file to the hard disk of your computer.

Computer Requirements

The minimum hardware and software requirements for the host computer needed to configure the edge device are:

- An Ethernet network card
- A serial port (not through a USB converter)
- Windows 2000 Service Pack 2 or higher, or Windows XP Service Pack 2

Setting Parameters

Before installing a wireless system, you need to set parameters relative to wireless communication, IP networking, and serial port. You also need to establish proper communication with the corresponding S3100 outdoor wireless access point.

The first step in installing an S1100w device is to change its IP address to ensure compatibility with an existing network. The default IP addresses of all devices are based on the APIPA addressing scheme and will be in the range 169.254.*X*.*Y*, where *X* and *Y* are relative to the MAC address of the individual device; for more information about APIPA, see page 57.

To work properly, devices on the same network must have unique IP addresses. The device will not prevent you from entering a duplicate address. However, its system status LED will turn to flashing red; then the device will use an APIPA address.

To configure a wireless system:

1. In a lab, unpack the transmitter and the access point and place them on a table.
2. Connect the external antenna on the S3100 and optionally on the S1100w.

   Warning: To avoid material damages, you must never power any two devices while their antennas are facing one another with a distance of less than 10 feet (3 meters).
3. Unpack the cable assembly (CAB9P) and plug its mating connector on the main connector of the S1100w transmitter.
4. Connect the DB-9 plug of the cable to a COM port on your computer.
5. Power the device using the red and black wires of the CAB9P cable (see page 22).

   The status LED turns steady red and then flashes green, indicating normal operation.
6. Configure the S1100w parameters with the command line interface (CLI):
   a. Country of operation
   b. Frequency band
   c. Passkey
   d. IP address
   e. Serial port parameters

   For the description of the procedure, see Chapter 4 on page 35.
7. Configure the wireless access point for a point-to-multipoint application.

   For the detailed procedure, refer to the *Nextiva S3100 Series User Guide*.
8. Using SConfigurator, ensure that the S3100 and the S1100w transmitters communicate well together:
   - In the Units tab, the S1100w should be hierarchically positioned under the S3100.
   - In the Link Status pane of the S3100, the S1100w should be in the Clients/Slaves list.
   - Ensure that there is end-to-end video transmission in the lab before installing the devices in their final location.

The initial configuration is now complete for the two devices.

Point-to-Point Connection

To allow video display on a monitor in a point-to-point context, you have to create a fixed connection between the S1100w transmitter and an S1970e-R receiver. You can connect to up to four transmitters to this receiver, to create four different point-to-point connections. Typically, both devices sit on the same IP subnet as SConfigurator and have the same VSIP port; to access other devices, refer to the device discovery section in the *SConfigurator User Guide*.

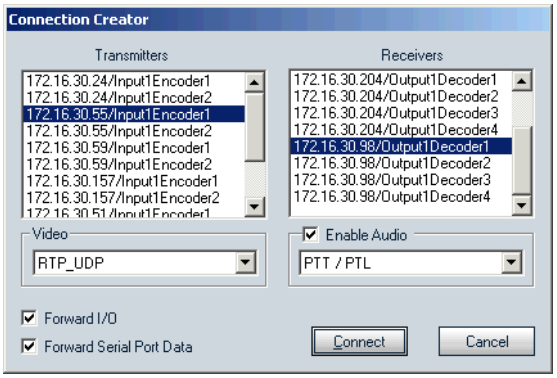
For more information about the connection procedure, refer to the “Managing Connections” chapter, in the *SConfigurator User Guide*.

To perform a point-to-point connection:

1. Start SConfigurator.
2. In the **Units** tab, discover the desired devices.

   The discovered devices appear in the Units box.
3. Select the **Connections** tab, then click **Add**.

   The Connection Creator window appears.



4. Select a transmitter in the left column and a receiver in the right one.

   In the Transmitters column, you have access to the two encoders of each input; the video stream is the same for both.
5. In the **Video** list, select the desired video mode.
6. To disable I/O data transmission (for example, alarms) between the two selected devices, clear **Forward I/O**.
7. To disable serial port data transmission (like PTZ commands), clear **Forward Serial Port Data**.
8. To enable audio between the devices, ensure that **Enable Audio** is checked, then select the audio mode.

   Note: On the S1970e-R, you can activate audio on a single connection only. The active audio connection is the last that was performed. Furthermore, the audio connection will remain the same even if the S1970e-R is in guard tour mode, that is, the receiver will not switch between the audio streams of its four connected transmitters. For more information, refer to the Nextiva S1900e Series User Guide.
9. Click **Connect**.
10. In the SConfigurator confirmation window, click **OK**.

You should now have video on the monitor connected to the receiver.

Installing the Wireless System

After configuring successfully your wireless system, you are ready to install it. To optimize your system radio performance, carefully review the site planning information presented in Chapter 2 on page 5. For more information about the installation procedure of your outdoor wireless access point, refer to the *Nextiva S3100 Series User Guide*.

Installing the Transmitter

Warning: When installing colocated wireless systems, you have to take into account the distance limitations listed on page 14.

Warning: Always mount the device with the mating connectors pointing downwards. Otherwise moisture may penetrate the device; the associated repair costs would not be covered by the warranty.

To install a transmitter:

1. To install the S1100w on a light pole or mast, use the supplied pole mount brackets and stainless steel clamps. For wall mounting, use the side brackets already installed on the device.
2. If you are installing the S1100w equipment in a lightning prone environment or in a site where large AC mains power fluctuations are a common occurrence, add additional external surge protection to all vulnerable connections.

   Vulnerable connections are those that run for a long distance between the S1100w device and the connected equipment. For more information about surge protection, see Appendix E on page 63.
3. If the S1100w device will be directly exposed to the sun in an environment likely to reach 122°F (50°C), install a sun shield.

   A derate of 13°F (7°C) is required to protect the equipment.
4. If required, install an external antenna (see page 27).
5. Apply silicone grease on the mating connector of the CAB9P cable and on the main connector of the device.

   For the detailed procedure, refer to the leaflet shipped with the cable.

   Warning: Failure to apply the grease will void the warranty.
6. Connect the CAB9P cable to the S1100w device.

   To properly install the cable connector on the device, you have to turn until you feel a positive click.
7. Plug the BNC video connector of the CAB9P cable on the camera.
8. Perform the serial connection to the camera, if required (see page 27).
9. If you are using a junction box, route all wires to it first; then route the wires from the box to the target device.
10. Power up the transmitter.

Installing an Antenna

If you bought a high gain antenna, install it after the S1100w is in place. The antennas provided by Verint Video Intelligence Solutions are designed to be mounted on a mast or pole of 2–3 inch (5–7.5 centimeter) diameter.

To install an external antenna:

1. Install the antenna above the S1100w device. If you bought your antenna from Verint Video Intelligence Solutions, use the supplied pole mount bracket.
2. Screw the SMA connector of the antenna cable to the S1100w antenna port and tighten it with a 0.25-inch (0.6 centimeter) wrench.

   Warning: Do not over-tighten to avoid damaging the connector. The recommended torque is 8 lb.-in. (100 N-cm). You could use a calibrated SMA torque wrench (for instance, from the Pasternack company, available at www.pasternack.com).
3. Apply two or three layers of electrical tape around all RF connections.

   The antenna cable and connectors are weather-tight; however, vibration caused by the wind will over time loosen the connectors and reduce the efficiency of the gaskets. The electrical tape will prevent this situation.
4. Carefully align the antennas of the S1100w and access point so that they have a clear RF line of sight.
5. To improve the signal level between both devices, use the antenna alignment utility from SConfigurator.

Performing the RS-422/485 Serial Connection

The Nextiva edge devices support only the RS-232, RS-422, and RS-485 asynchronous protocols. For any other protocol, you may need a converter.

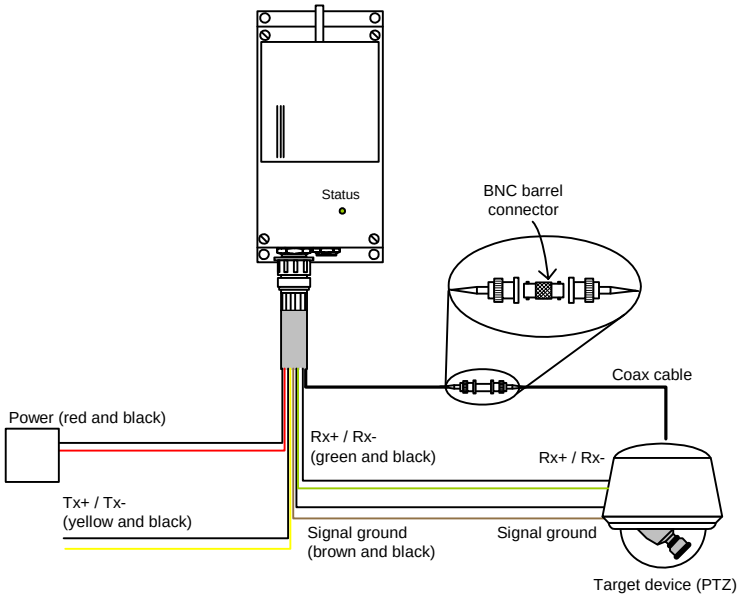
Warning: At any time there must be only one serial peripheral connected to the edge device. For instance, when configuring the device through a COM port of the computer, you must unplug any RS-422/485 peripheral.

RS-422/485

You use the CAB9P cable to properly connect the device to an RS-422 or RS-485 peripheral. Here is the wiring scheme for the four-wire RS-422 or RS-485 protocol:

Cable			Peripheral
Signal name	**Wire pair**	**Wire color**	**Signal name**
Rx+	green/black	green	Rx+
Rx-		black	Rx-
Tx+	yellow/black	yellow	Tx+
Tx-		black	Tx-
Signal ground	brown/black	brown	Signal ground
Signal ground		black	Signal ground

For example, here is an S1100w transmitter connected to a PTZ camera in an RS-422 2-wire context:



For a two-wire, half-duplex RS-485 connection:

1. Use the following wiring scheme:

Cable Signal name	Wire pair	Wire color	Peripheral Signal name
Data+	green/black	green	Data+
Data-		black	Data-
Signal ground	brown/black	brown	Signal ground
Signal ground		black	Signal ground

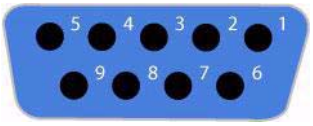
2. Set the line driver to the 485h-f value (see page 38).

RS-232

For an RS-232 connection, use the following wiring scheme to plug the device to the peripheral, using the DB-9 connector on the CAB9P cable:

DB-9 pin number	Cable signal name
2	RxD
3	TxD
5	Signal ground
7	RTS
8	CTS

The numbering of the pins on the DB-9 connector is:



Configuring the I/Os

To program alarms (or events) or use the audio features of the S1100w device, you need the CAB8P cable assembly. For detailed pinout information, see page 55.

The S1100w supports two inputs and one output. Each signal has a dedicated purpose:

- Input 1—Either a transparent alarm link in a point-to-point configuration or with a video management software, or PTL (push-to-listen) audio transmission mode.
- Input 2—Push-to-talk (PTT) audio transmission mode.
- Output—Relay for the input 1 signal in point-to-point alarm mode.

You cannot program PTT/PTL audio and alarms at the same time, since input 1 is used in both contexts.

Since the S1100w transmitters are mostly used with a video management software, you will perform most configuration and activation steps in it. Otherwise, in a point-to-point connection, you use SConfigurator for setup.

Audio

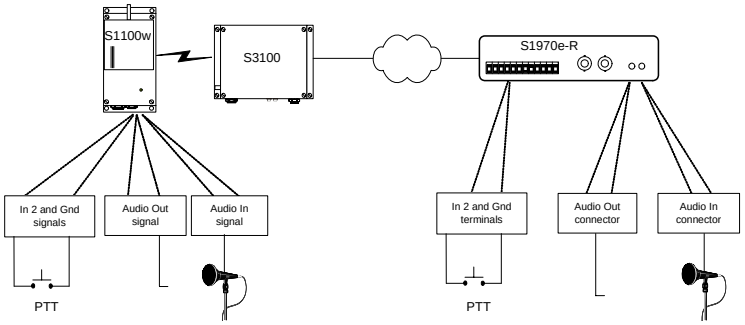
Two transmission modes for audio data are available, provided audio is supported everywhere in your system:

- Full duplex—Data is transferred in both directions simultaneously. The I/Os are available for alarms.
- PTT—The push-to-talk mode allows you to control audio communication between two devices.

When creating a point-to-point connection between an S1100w transmitter and an S1970e receiver in SConfigurator, you set the transmission mode in the Connection Creator window.

To activate the audio transmission channel, you must trigger an activation switch (for example, a button) that is based on the shorting of the alarm input 2 and alarm ground signals. If the PTT switches of both the transmitter and receiver are activated at the same time, the receiver will have precedence: Audio will be transferred from the S1970e receiver to the S1100w transmitter.

Here is a typical PTT application in a point-to-point context:



The S1100w device supports the line-in input type. With SConfigurator, ensure that the input type in the Audio tab reflects this value.

Regardless of the transmission mode, the connections for the audio equipment are:

- You plug the audio input signal of the device to the Line-out connector on a pre-amplifier. Then you plug a microphone on the pre-amplifier.
- You plug the audio output signal of the device to the Line-in connector on an amplifier. Then you plug a speaker on the amplifier.

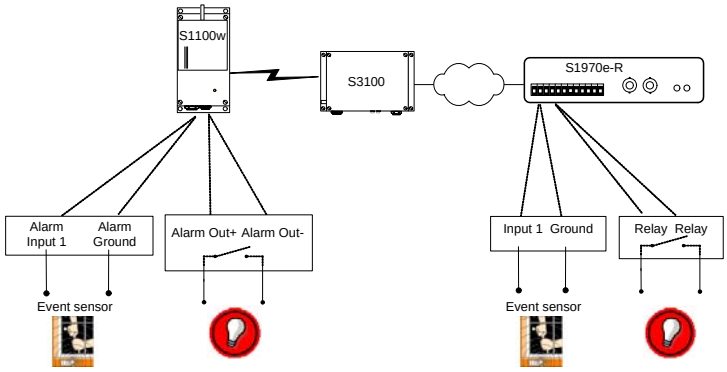
The audio input/output specifications are:

Mode	Gain	Impedance	Frequency range
Input	-20 to -3 dBV	30 kohm	300–3600 Hz
Output	-45 to -3 dBV	8 ohms min.	

Alarms

The S1100w device can generate and receive alarms. To generate an alarm, you have to short the alarm input 1 and alarm ground signals on the S1100w device.

When receiving an alarm in a point-to-point configuration, the relay output is configured to close the contact between the two alarm output pins (up to 48V at 100 mA). For example, with an S1970e receiver:



With SConfigurator, you activate the alarm process by checking the Forward I/O box in the Connection Creator window.

Updating the Firmware

You can update the firmware of the S1100w devices with the SConfigurator utility or a video management software; for the detailed procedure, refer to the documentation of the software. The latest firmware files are available on the Verint Video Intelligence Solutions extranet (Technical Support, then Downloads, then Firmware Upgrades).

Warning: Firmware downgrade is not supported on any device. If you perform a downgrade, any problem encountered will not be covered by your product warranty.

The preferred method to update the firmware is through an IP network connection. If this update procedure fails:

1. Do not reboot the device, and restart the same procedure immediately.

   If you reboot the device before proceeding with the update procedure, it will stop responding.

2. If the problem persists, perform a firmware update through the RS-232 serial port.

You should take into consideration the following facts regarding firmware update using the IP network:

- It can be deactivated in the command line interface (CLI).
- Ensure that the IP link is stable before starting the procedure; therefore it is not recommended to perform it over the Internet.

Performing a Hardware Reset

You can perform a hardware reset on the transmitter. This operation will assign the factory default settings to the S1100w (listed in Appendix A on page 51). All user-defined values will be lost. To reset the device parameters to their factory defaults without performing a hardware operation, see page 49.

Following a reset, you will need to reprogram the S1100w device (for instance, its IP address, VSIP port, and wireless passkey) for proper operation within its network or with its wireless access point.

To perform a hardware reset:

1. Power down the device.
2. Short the TxD and CTS wires together (to locate them, see page 54).
3. Power up the device and wait until the normal boot-up sequence is completed.
4. Remove the short on the TxD and CTS pins.

The device is ready for use with the factory default settings.

Red/Blue Display

If an S1100w transmitter currently streaming video to a management software loses its connection to a camera, the corresponding display tile in the software will present an error sequence, typically a half red, half blue pattern.

Quality of Service

Quality of Service (QoS) is a set of low-level networking protocols giving higher priority to more important data flows while ensuring that the less important ones do not fail. QoS is an essential technology for organizations rolling out a new generation of network applications such as real-time voice communications and high-quality video delivery.

In the Nextiva edge devices, the two available QoS flavors are Type of Service (ToS) and Differentiated Service Code Points (DSCP).

For QoS to be taken into account, the network infrastructure equipment (switches and routers) must support one of these protocols. If any of these devices does not support QoS, the QoS data will simply be processed as traditional non-QoS data. Furthermore, all Nextiva edge devices on a network must support the same QoS protocol (or no protocols at all).

You can set a priority flag to three data types coming out of an edge device: video, audio, and control. A QoS-enabled switch (or router) uses this flag to determine how the current data compares to what is currently going through it.

To set the QoS values, you need to go in the command line interface (CLI) of the device, access the Advanced > Quality of Service menu. For the procedure to access the CLI, see page 35.

Status LED

The system status LED is a bicolor (green-red) LED providing detailed information on the current state of the device.

Condition	Indication
Steady red for 5 sec.	The device is powering up.
Flashing red (1 sec. intervals)	The IP address of the device is already assigned to another device in the network.
Flashing green (3 sec. intervals)	The firmware has started, but RF communication is not established.
Flashing green (1 sec. intervals)	The firmware has started, RF communication is established, but no video/serial* data is transmitted.
Flashing green (0.2 sec. intervals)	The firmware has started, RF communication is established, and video/serial* data is transmitted.
Three consecutive red blinks every 2 sec.	No video source is detected and no video is transmitted.
Flashing green-red (1 sec. intervals)	The device is undergoing a firmware update or is in backup mode.
Flashing red (0.1 sec. intervals)	The device is being identified.

* At least one of them must be transferred to obtain the LED condition.

The following power-up conditions on the system status LED are abnormal:

- LED not lit—Check the power supply and cabling. If power is available and the LED stays off, call Verint Video Intelligence Solutions customer service for assistance.
- Steady red LED persisting more than 10 seconds—There is an internal error that prevents the device from starting normally. Power down the device, wait 30 seconds, then power it up. If the condition persists, call Verint Video Intelligence Solutions customer service.
- Flashing green-red LED not during a firmware update—The device requires a new firmware with a serial connection.

4

Setting Parameters with the CLI

The S1100w devices come with a simple command line interface (CLI) for configuration purposes. The CLI is hierarchically organized, with menus, sub-menus, and individual options representing configuration parameters. Only the parameters that you are likely to change are described.

Getting Started

You can access the CLI with:

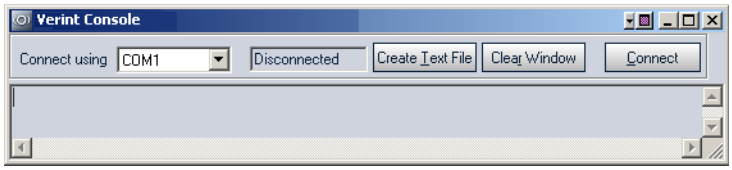
- A serial connection and the SConfigurator console
- A network connection and the Telnet utility

To access the CLI with the SConfigurator console:

1. Connect the S1100w device to a COM port of the computer using the DB-9 connector of the CAB9P cable.
2. Start SConfigurator.

   The SConfigurator window appears.
3. From the General tab, click **Console**.

   The Verint Console window appears.



4. In the **Connect using** list, select the COM port used to communicate with the device.
5. Click **Connect**.

   The CLI main menu appears.

```
*******************************
Main Menu
-------------------------------
Menus:
1) Serial Port
2) Access Management
3) Network
4) Wireless Communication
5) System Status
6) Advanced

Commands:
s) Save Settings
r) Reboot System
l) Load Default Configuration
q) Quit
*******************************
```

   The CLI has a timeout that is triggered after three minutes of inactivity. When the timeout occurs:

   - You lose access to the command line.
   - The “Thank you for using the Verint CLI” message appears at the command line.
   - The Verint Console window becomes disabled.
   - The Disconnect button switches to Connect.
6. To reactivate the CLI after a timeout, click **Connect**.

7. To work through the CLI menu structure, follow these guidelines:
   - To execute a command or open a menu, type in the corresponding letter or number, then press **Enter**.
   - To return to the previous menu, enter **p**.
8. To end the CLI work session:
   a. Save the settings by entering **s** at the main menu, then pressing **Enter**.
   b. Exit the CLI by entering **q** at the main menu, then pressing **Enter**.

      Depending on the changed settings, the device may perform a soft boot.
   c. Close the Verint Console window.

      Warning: Do not use the Disconnect button to exit the CLI. Clicking it does not free the RS-232 connection and does not save your settings.

To enter the CLI with Telnet:

Note: Ensure that your computer and the S1100w device are in the same IP subnet.

1. Open SConfigurator.
2. In the **Units** tab, discover the devices.
3. Select the desired device, then click **Telnet**.

   The CLI main menu appears in the Verint Console window.

Serial Port

The Serial Port menu enables you to establish the proper settings ensuring compatibility between the S1100w and the serial equipment with which it is connected (for example, PTZ camera). For more information about the serial port settings of this hardware product, refer to its user guide or contact your manufacturer.

The S1100w transmitters have one configurable serial port for communicating with an external device.

```
************************
Main Menu \ Serial Port
------------------------

Menus:
1) RS-232/422/485

Commands:
p) Previous Menu
************************
```

The parameters for the serial port are:

```
*********************************************
Main Menu \ Serial Port \ RS-232/422/485
---------------------------------------------
Parameters:
1) Bit Rate                 : 4800 bits/second
2) Parity                   : None
3) Stop Bits                : One
4) Data Bits                : 8
5) Line Driver              : RS-422
6) RS-422/485 Operating Mode: RS-422 4 Wires

Commands:
p) Previous Menu
*********************************************
```

Bit Rate

The bit rate represents the data rate at which the target product operates. Possible values range from 1200 bps to 230,400 bps.

Parity

The serial equipment may have a parity of *odd* or *even*. It may also not have parity check; most communication devices do not use parity.

Line Driver

By default, your device automatically detects the electrical line interface of the serial port (RS-232 or RS-422/485). However, if your device cannot properly detect the electrical level (for instance when there is too much noise on the line or too much signal attenuation due to excessive cable length), you can use the line driver setting to force its electrical line interface.

Here are the possible line driver settings, where `-d` indicates that the auto-detection mode is activated, and `-f`, that the line driver is forced:

Setting	Description
232f-d	RS-232 auto-detected, full-duplex operation
232f-f	RS-232 forced, full-duplex operation
485f-d	RS-422/485 auto-detected, 4-wire full-duplex, RS-485 operation
485h-d	RS-422/485 auto-detected, 2-wire half-duplex, RS-485 operation
485h-f	RS-422/485 forced, 2-wire half-duplex, RS-485 operation
485f-f	RS-422/485 forced, 4-wire full-duplex, RS-485 operation
422f-d	RS-422/485 auto-detected, 4-wire full-duplex, RS-422 operation
422f-f	RS-422/485 forced, 4-wire full-duplex, RS-422 operation

Warning: If the line driver is forced to an RS-422/485 setting, you will not have access to the CLI unless you use an RS-485 to RS-232 converter or perform a hardware reset (described on page 31).

RS-422/485 Operating Mode

The operating mode setting enables you to establish the way your RS-422/485 serial equipment will interface with the S1100w device. The supported modes are:

- RS-422 4 Wires
- RS-485 4 Wires
- RS-485 2 Wires

Access Management

The Access Management menu takes care of user accounts (user names and passwords) and device security.

```
*******************************
Main Menu \ Access Management
-------------------------------
Menus:
1) User Accounts
2) Security

Commands:
p) Previous Menu
*******************************
```

User Accounts

The User Accounts menu enables you to protect the configuration of the device by restricting its access with a user name and a password. Once the user account mode is activated, you need the user name/password combination to access the CLI through a serial connection or a Telnet session.

```
*********************************************
Main Menu \ Access Management \ User Accounts
---------------------------------------------
Parameters:
1) User Accounts          : Disabled
2) Administrator User Name: USERNAME
3) Administrator Password : PASSWORD

Commands:
p) Previous Menu
*********************************************
```

Security

The Security menu holds commands relative to the protection of the device.

```
*******************************************
Main Menu \ Access Management \ Security
-----------------------------------------
Parameters:
1) IP Firmware Update     : Enabled
2) Telnet Session         : Enabled
3) XML Report Generation  : Enabled
4) Global Security Profile: Disabled
5) SSL Passkey            :

Commands:
p) Previous Menu
*******************************************
```

It allows you to control:

- Firmware updates through the IP network
- Access to Telnet
- SSL

IP Firmware Update

You can prevent firmware updates to be performed on your device through the IP network. By default, this type of update is allowed.

For more information about firmware updates, refer to the *SConfigurator User Guide*.

Telnet Session

By default, you can use Telnet to access the CLI of your device. To improve the security of your system, you may prohibit such an access. In this case, the CLI will only be accessible through a serial connection (with the SConfigurator console).

Global Security Profile

If you activate the global security profile, the device will only accept secure SSL connections. It also means that you cannot access the device anymore with Telnet and you cannot perform firmware updates through the IP network on it.

SSL Passkey

To secure a device with SSL, you need to provide a passkey. This passkey must be the same for all devices and the software tools to allow proper secure communication between them.

It is recommended to perform this operation in SConfigurator (version 2.55 or higher for the tool and the device) or nDVR (in the Resource Administration Tool). Otherwise, to build a truly secure system, you should access the CLI through a physical serial connection, not through Telnet, therefore avoiding eavesdropping on the network.

Network

The Network menu allows you to configure several parameters to ensure the compatibility between the S1100w and its IP network.

```
**************************************************
Main Menu \ Network
--------------------------------------------------
Parameters:
1) DHCP Configuration           : Disabled
2) Local IP Address             : 172.16.23.205
3) Subnet Mask                  : 255.255.0.0
4) Gateway                      : 172.16.23.205
5) Primary DNS Server Address   : 0.0.0.0
6) Backup DNS Server Address    : 0.0.0.0
7) Ping Request Target          : 0.0.0.0
8) Ping Request Send Buffer Size: 32

Commands:
i) Ping Remote Address
p) Previous Menu
**************************************************
```

For more information about these settings, contact your network administrator.

DHCP Configuration

DHCP (dynamic host configuration protocol) allows devices and computers connected to a network to automatically get a valid network configuration from a server. For more information about DHCP, see Appendix C on page 57.

You can set this option only if the S1100w is connected to a network that uses a DHCP server.

Local IP Address

The IP address is the identifier of the S1100w on the network. Its format is a 32-bit numeric address written as four numbers separated by periods. Each number is in the 0–255 range. Each device on a network must have a unique IP address.

Subnet Mask

The subnet mask is the binary configuration specifying in which subnet the IP address of the device belongs. A subnet is a portion of a network that shares a common address component. On TCP/IP networks, a subnet is defined as a group of devices whose IP addresses have the same prefix. Unless otherwise specified by your network administrator, it is recommended to use a subnet mask of 255.255.0.0.

Gateway

The gateway represents a network point that acts as an entrance to another network.

Warning: Never use the IP address of the device as the gateway value.

Ping Request

Ping is a basic Internet program that allows you to check that a particular IP address exists and can accept requests.

To ping a specific device:

1. In the **Ping Request Send Buffer Size** parameter, enter the buffer size (in bytes).
2. In the **Ping Request Target** parameter, enter the IP address of the device.
3. Execute the **Ping Remote Address** command.

Wireless Communication

The Wireless Communication menu contains a set of parameters relative to radio frequency (RF) and wireless security. The parameter set varies depending on the MAC mode (SPCF or 802.11).

The parameters for SPCF are:

```
************************************************************
Main Menu \ Wireless Communication
------------------------------------------------------------
Menus:
1) Advanced Wireless Setup

Parameters:
 2) Passkey                  : ********
 3) MAC Mode                 : SPCF
 4) MAC Role                 : Client
 5) RF Band                  : public safety  (4.9 GHz OFDM)
 6) Channel                  : Auto
 7) Channel Bandwidth        : 20 MHz channel
 8) Tx Bit Rate              : Auto
 9) Antenna Gain             : 13 dBi
10) ISO Country Code         : UNITED_STATES (840)

Commands:
p) Previous Menu
************************************************************
```

The parameters for the 802.11 protocol are:

```
*******************************************************
Main Menu \ Wireless Communication
-------------------------------------------------------

Menus:
1) Advanced Wireless Setup

Parameters:
 2) MAC Mode                   : IEEE 802.11
 3) Service Set Type           : Infra (BSS)
 4) SSID (Service Set ID)      : MyTestSsid
 5) WPA Authentication Method  : WPA-PSK
 6) Encryption Algorithm       : AES-CCMP
 7) WPA Encryption Passphrase  : ********
 8) WPA Private Key Passphrase : ********
 9) WPA Negociation Timeout    : 45 s
10) WPA Reauthentication Period: 1 day
11) WPA EAP Login              : Verint
12) WPA EAP Password           : ********
13) RF Band                    : 802.11a (5 GHz OFDM)
14) Channel                    : Auto
15) Tx Bit Rate                : Auto
16) Antenna Gain               : 13 dBi
17) ISO Country Code           : UNITED_STATES (840)

Commands:
p) Previous Menu
*******************************************************
```

Basic Parameters

Passkey (SPCF only)

The wireless passkey is a unique case-sensitive identifier enabling secure and encrypted RF communication between the S1100w device and its access point. The passkey size varies depending on the key entry format (presented on page 46):

- 32 digits if hexadecimal
- 16 string characters if string (default)

For the wireless connection to be secure, do no enter a known name (like a street name), but instead use a mix of digits and letters. Furthermore, do not disclose the passkey. The connection security is based on the secrecy and uniqueness of the passkey.

It is a good practice to change the default passkey during the configuration process.

MAC Mode

The available MAC (Media Access Control) protocols are:

- SPCF—The proprietary protocol that uses AES encryption (with key rotation) over the wireless link to secure communication between the devices and resolve “hidden node,” quality of service, range, and problems inherent to 802.11 wireless networking products. The access point for an S1100w in SPCF is the Nextiva S3100.
- IEEE 802.11—The standard protocol for using commercial 802.11-compliant access points.

SSID (Service Set ID) (802.11 only)

The service set ID is the name of the wireless network; it is a 0–32 character string.

The service set ID must be the same in the S1100w and in the access point.

WPA Authentication Method (802.11 only)

The S1100w in 802.11 mode supports the following authentication mechanisms:

- WPA-PSK (Wi-Fi Protected Access version 1 in Pre-Shared Key mode, also known as *personal* mode)
- WPA2-PSK (WPA version 2, also known as *802.11i*, in personal mode)
- WPA-EAP-TLS (WPA in Enterprise mode with Extensible Authentication Protocol and Transport Layer Security)
- WPA2-EAP-TLS
- WPA-EAP-TTLS (MSCHAPv2) (WPA in Enterprise mode with Extensible Authentication Protocol, Tunneled Transport Layer Security, and the Microsoft version of the Challenge Handshake Authentication protocol)
- WPA2-EAP-TTLS (MSCHAPv2)
- WPA-PEAP-TLS (MSCHAPv2) (WPA in Enterprise mode with Protected Extensible Authentication Protocol, Transport Layer Security, and the Microsoft version of the Challenge Handshake Authentication protocol)
- WPA2-PEAP-TLS (MSCHAPv2)

You can also choose to not use an authentication method.

The authentication method must be the same in the S1100w and in the access point.

Encryption Algorithm (802.11 only)

The encryption algorithm indicates how wireless data is encrypted. The following algorithms are available:

- WEP (Wired Equivalent Privacy)—This encryption type is available only when the authentication method is NONE.
- AES-CCMP (Advanced Encryption Standard-Counter Mode CBC-MAC Protocol)
- TKIP (Temporal Key Integrity Protocol)
- WPA-AUTO-SELECT—The encryption type is automatically chosen.

You can also choose to not use an encryption algorithm.

The encryption algorithm must be the same in the S1100w and in the access point.

WPA Encryption Passphrase (802.11 only)

The encryption passphrase is an identifier (from 8 to 63 characters) used to secure the RF communication between the S1100w device and its access point when the authentication method is any WPA or WPA2 flavor.

For the wireless connection to be secure, do no enter a known name (like a street name), but instead use a mix of digits and letters. Furthermore, do not disclose the passphrase. The connection security is based on the secrecy and uniqueness of the passphrase.

It is a good practice to change the default passphrase during the configuration process.

The passphrase must be the same in the S1100w and in the access point.

WPA Private Key Passphrase (802.11 only)

The private key passphrase is a case-sensitive identifier (from 0 to 63 characters) used to secure the access to an 802.11 certificate.

WPA Negotiation Timeout (802.11 only)

The negotiation timeout is the maximum time (in seconds) given for the device to be authenticated.

WPA Reauthentication Period (802.11 only)

The reauthentication period is the frequency (in days) at which the authentication process will be re-activated with new keys, if a WPA2 authentication method was selected.

WPA EAP Login (802.11 only)

The EAP login is a case-sensitive identifier (from 0 to 63 characters) used to recognize the device when a TTLS or PEAP authentication method was selected.

WPA EAP Password (802.11 only)

The EAP password is a case-sensitive password (from 0 to 63 characters) used to secure the authentication process when a TTLS or PEAP method was selected.

WEP Key (802.11 only)

The WEP key is a case-sensitive identifier used to secure the RF connection when the authentication method is NONE; this parameter is not displayed in the other contexts.

The size of the key varies depending on the WEP scheme:

- 5 string or 10 hexadecimal characters in 64-bit WEP
- 13 string or 26 hexadecimal characters in 128-bit WEP
- 16 string or 32 hexadecimal characters in 152-bit WEP

The WEP key must be the same in the S1100w and in the access point.

RF Band

The following frequency bands are available:

- 802.11a (5 GHz OFDM)
- 802.11g (2.4 GHz OFDM)
- public safety (4.9 GHz OFDM)

Channel

The RF channel used by the S1100w device is determined by its wireless access point. However, in a non-DFS context, you can specify an initial value for the *roaming* process by which the S1100w will find its access point; be aware that this initial channel may not be the one used by the access point.

In a 4.9 GHz band context, the list of channels varies depending on the chosen bandwidth. For the list of channels, see page 7; for the channel bandwidth parameter, see next.

Channel Bandwidth

In the 4.9 GHz band, the bandwidth can be fragmented to allow 5- and 10-MHz channels; the default channel width is 20 MHz. This parameter only appears if the RF band is 4.9 GHz. The list of available channels varies depending on the chosen bandwidth.

Tx Bit Rate

The transmission bit rate is the data rate at which the device operates. A high bit rate reduces the effective distance between two functional devices.

When an S1100w connects to its master for the first time, it automatically receives the best possible value (the Auto value), with a default RF margin set to 15 dB (to change the margin, see page 47).

Once the device is operating properly, Verint strongly recommends to change the configured bit rate from Auto to the actual bit rate of the connection. This way, the wireless communication will be more stable in the presence of changing atmospheric conditions or other RF interferers. To know the actual bit rate of the connection, look in the Advanced > Communication Status and Statistics > Wireless Status menu. If the quality of the RF link degrades severely, the actual bit rate could be lower that the manually configured one.

The available bit rates for the S1100w device are:

Band	Channel width	Bit rates (Mbps)
2.4 GHz	N/A	6, 9, 12, 18, 24, 36, 48, and 54
4.9 GHz	5 MHz	1.5, 2.25, 3, 4.5, 6, 9, 12, and 13.5
	10 MHz	3, 4.5, 6, 9, 12, 18, 24, and 27
	20 MHz	6, 9, 12, 18, 24, 36, 48, and 54
5 GHz	N/A	6, 9, 12, 18, 24, 36, 48, and 54

Antenna Gain

If you enter the gain of the antenna you connect to the device, the S1100w will be able to automatically change its transmission power so that the total power (device and antenna) does not exceed the maximum value established by your country's regulations. For more information about the maximum antenna gain you can use, see page 19.

ISO Country Code

You must assign the proper country of operation to the device, so that it will:

- Comply to the DFS/TPC regulations, if applicable
- Respect the EIRP rules
- Use the proper set of frequency channels

Advanced Parameters

The Advanced Wireless Setup menu contains specialized RF features. The parameter set varies depending on the MAC mode (SPCF or 802.11).

The parameters for SPCF are:

```
**********************************************************
Main Menu \ Wireless Communication \ Advanced Wireless Setup
----------------------------------------------------------
Parameters:
1) Passkey Entry Format         : String
2) Tx Power Scale               : Maximum
3) Sensitivity Threshold        : Normal
4) Minimum Margin               : 15 dB
5) Physical Error Rate Threshold: 5000
6) Indoor/Outdoor RF Regulation : Indoor/Outdoor FCCA FCC1

Commands:
p) Previous Menu
**********************************************************
```

The parameter for the 802.11 protocol are:

```
**********************************************************
Main Menu \ Wireless Communication \ Advanced Wireless Setup
----------------------------------------------------------
Parameters:
1) Passkey Entry Format         : String
2) Tx Power Scale               : Maximum
3) RTS Threshold                : 2342
4) Physical Error Rate Threshold: 5000
5) Indoor/Outdoor RF Regulation : Indoor/Outdoor FCCA FCC1

Commands:
p) Previous Menu
**********************************************************
```

Passkey Entry Format

The wireless and WEP passkeys can have two formats: String (default) or Hexadecimal.

Tx Power Scale

The transmission power scale indicates the level of emitting power of the device radio. The available values are:

- Maximum—The maximum allowed.
- 50%—The power is reduced by 3 dB.
- 25%—The power is reduced by 6 dB.
- 12.5%—The power is reduced by 9 dB.
- Minimum—The power is set at 3 dBm.

Sensitivity Threshold (SPCF only)

The sensitivity threshold is the minimum signal level perceived by the radio of the device.

Reducing the sensitivity of the radio enables unwanted “noise” to be filtered out. A safe value is 10 dB below the current received signal level (displayed in the Advanced > Communication Status and Statistics > Wireless Status menu).

The default value, Normal, represents the most sensitive context. You must be careful not to reduce the sensitivity to a level where the device would not “hear” its legitimate correspondent.

Minimum Margin (SPCF only)

The minimum margin is used when the transmission bit rate is set to Auto (see page 45). It represents the difference in dB between the actual signal received by the device and the minimum signal required by a given bit rate to correctly receive data on the RF link. The default minimum margin is 15 dB.

Indoor/Outdoor RF Regulation

Depending on the country of operation and the chosen frequency band, the device is allowed to operate indoors only, outdoors only, or either indoors or outdoors. The frequency channels available in the indoor-only regulation are different from those assigned to indoors/outdoors; the same goes for the outdoor-only channels.

Note: Under the RF regulation, a device programmed to be used only indoors must not be installed outdoors, and vice versa.

To know which frequency channels are available in your country of operation in each of the three operation modes, refer to the *Wireless Frequency Plan* document located on the Verint Video Intelligence Solutions extranet (Technical Support, then Downloads, then Utilities and Tools).

The default factory value for most countries is indoor/outdoor.

System Status

The system status information indicates the current values of internal S1100w parameters, including the firmware version.

```
************************************************************
Main Menu \ System Status
------------------------------------------------------------
Menus:
1) Storage

Parameters:
    ISO Country Code : UNITED_STATES (840)
    Firmware Version : 4.10-  build 256
    Loader Version   : 5.00-  build 47
    Build Date       : Feb  6 2007 at 17:20:43
    CPU Info         : Rev. 1.0
    CPU Frequency    : 206250000
    Uptime           : 00:45:13
    Serial Number    : 000b6b-5722a9
    CPLD Version     : 0
    Internal Value 1 : 2570000 / 16
    Audio Hardware   : Present
    Production Date  : 11/06
    Module Radiant   : Absent
    Board Temperature: 42

Commands:
p) Previous Menu
************************************************************
```

Advanced

The Advanced menu holds a series of advanced setups mainly used by Verint Video Intelligence Solutions technical support. Some of these parameters are available through SConfigurator or a video management software.

```
*****************************************
Main Menu \ Advanced
-----------------------------------------
Menus:
 1) Video
 2) Video Status
 3) System Time
 4) System Time Stats
 5) Serial Port (IP)
 6) VSIP
 7) VSIP Statistics
 8) Audio
 9) License Management
10) Serial Port Status
11) Test and Debug
12) Communication Status and Statistics
13) Quality of Service

Commands:
i) Identify Unit
v) Display Volatile Stream Information
p) Previous Menu
*****************************************
```

Identifying a Device

To recognize an S1100w among a large set of devices, you can make its LED flash red rapidly.

To identify an S1100w device:

1. From the main menu, choose **Advanced**, then press **Enter**.
2. Enter **i** to make the LED flash red. Re-enter **i** to set the LED to its previous state.
3. Enter **p** until you are in the main menu.
4. Enter **q** to exit.

Setting the VSIP Port

The VSIP port (accessible through the VSIP menu) is a communication port used for protocol messaging between your computer and Nextiva devices. The default VSIP port of all devices is 5510.

Note: VSIP ports 9541, 65500, and those under 1024 are reserved and should not be used, not even for serial port, video, or audio communication. The maximum value is 65535.

Conducting Site Surveys

The S1100w device allows you to perform site surveys on your RF network. A site survey scans all frequency channels, evaluate the interference level in each channel, and allows you to choose the channel with the less interference.

```
**********************************************************
Advanced \ Communication Status and Statistics \ Wireless Status
----------------------------------------------------------
Parameters:
    NIC Name                     : AT5004X CM9 A,B,G 2.4-5.8 GHz
    NIC MAC Address              : 00-0B-6B-57-22-A9
    Current Channel              : 6 (2437 MHz)
    Current TX Rate              : 54 Mb/s
    Current RX Rate              : 54 Mb/s
    Average Signal Level         : -50 dBm
    Current SCF Connection Status: Connected to 00-0B-6B-2F-F8-E5
    RF Communication Quality     : |>>>>>>>>>>| EXCELLENT
    RF Margin                    : |>>>>>>>>>>| EXCELLENT (22dB)
    Current EIRP                 : 31 dBm
    Maximum EIRP allowed         : 36 dBm
    Indoor/Outdoor RF Regulation : Indoor/Outdoor FCCA FCC1
 1) Site survey iteration        : 1

Commands:
1) Display link(s) Info
s) Start/Stop Site Survey
v) Visualize Last Site Survey Report
r) Reset Site Survey data base
p) Previous Menu
**********************************************************
```

You can perform the following operations relative to RF site surveys:

- Specify the number of consecutive surveys to perform
- Start and stop a site survey
- Look at the last survey report
- Reset the survey database

To conduct site surveys:

1. From the main menu, choose **Advanced > Communication Status and Statistics > Wireless Status**, then press **Enter**.
2. Perform the required operations.

   Note: During the site survey execution, the RF link will be momentarily broken (duration varies depending on the number of iterations). The link is automatically restored when the survey is finished.
3. Enter **p** until you are in the main menu.
4. Enter **q** to exit.

Load Default Configuration

The Load Default Configuration command, located in the main menu, resets all device parameters to their factory settings (described in Appendix A on page 51). All user-defined values will be lost. To reset the parameters to their factory defaults with a hardware operation instead, see page 31.

Following a reset, you will need to reprogram the S1100w device (for instance, its IP address and VSIP port) for proper operation within its network.

Reboot System

The Reboot System command, located in the main menu, performs a soft boot on the S1100w. A system reboot clears all unsaved changes in the CLI and returns to your preset configuration.

A

Factory Default Configuration

The S1100w is programmed at the factory with the following configuration:

Type	Configuration
Serial port	■ Bit rate: 4800 bauds ■ Data bits: 8 ■ Parity: none ■ Stop bit: 1 ■ Line driver: auto-detected ■ RS-422/485 operating mode: RS422 4 Wires
Access management	■ User name: USERNAME ■ Password: PASSWORD ■ User accounts: Disabled ■ Telnet sessions: Enabled ■ IP firmware update: Enabled ■ Global security profile: Disabled ■ SSL passkey: <empty>
Network	■ DHCP configuration: Disabled ■ IP address: 169.254.*.* (MAC address of the device) ■ Subnet mask: 255.255.0.0 ■ Gateway: 0.0.0.0
Video settings (North America)	■ Target frame rate: 30 fps ■ Target bit rate: 800 kbps ■ Maximum quantizer: 24 ■ Resolution: CIF (352 x 240) ■ Video standard: NTSC
Video settings (Europe)	■ Target frame rate: 30 fps ■ Target bit rate: 800 kbps ■ Maximum quantizer: 24 ■ Resolution: CIF (352 x 240) ■ Video standard: PAL
Wireless Communication (North America)	■ Wireless passkey: ABCDEFGHIJKLMNOP ■ Frequency band: 802.11a (5 GHz OFDM) ■ Channel: Auto ■ Tx bit rate: Auto ■ Antenna gain: 13 dBi ■ Country: USA ■ Tx power scale: Maximum
Wireless Communication (Europe)	■ Wireless passkey: ABCDEFGHIJKLMNOP ■ Frequency band: 802.11a (5 GHz OFDM) ■ Channel: Auto ■ Tx bit rate: Auto ■ Antenna gain: 13 dBi ■ Country: United Kingdom ■ Tx power scale: 50% (-3 dB)
VSIP	■ VSIP Port: 5510 ■ VSIP Multicast IP Address: 224.16.32.1 ■ VSIP Discovery IP Address: 255.255.255.255

B

Cable Connections

The wireless devices use the following two cables:

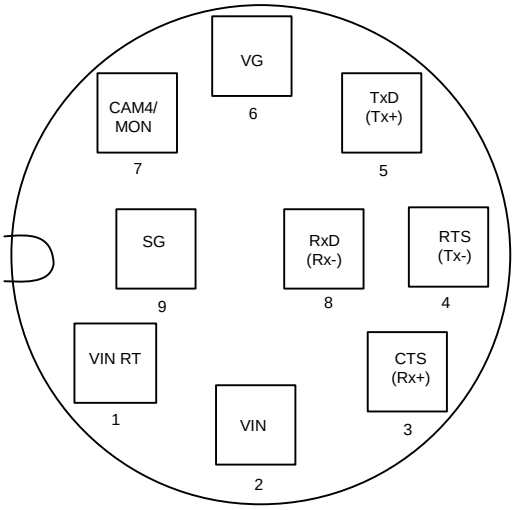
- CAB9P—Power, video, and serial data communication
- CAB8P—Audio and alarms

Note: To determine the Rx and Tx pins of your equipment, see Appendix D on page 59.

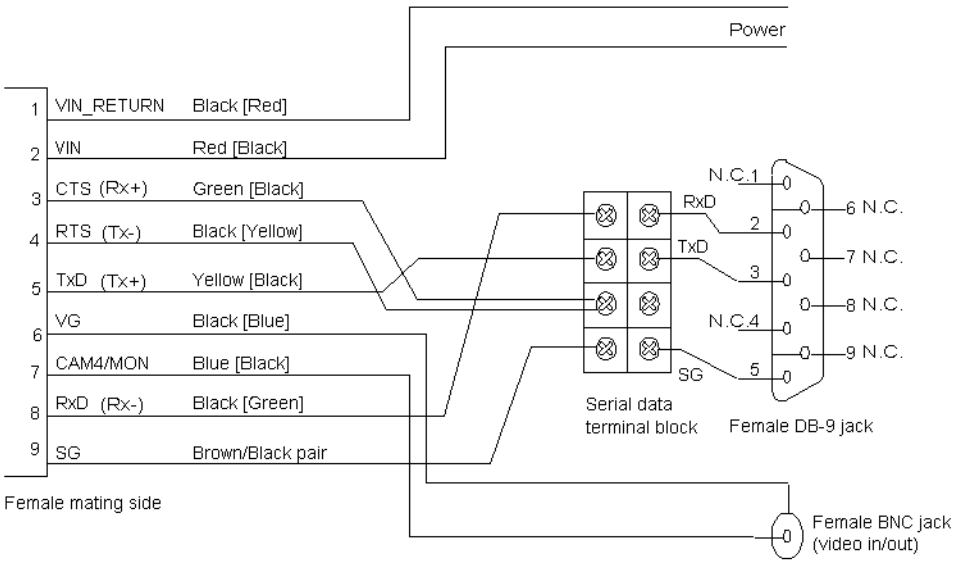
CAB9P

The CAB9P cable supplied with the wireless devices is used for power, video, and serial communication (that is, PTZ data with the RS-422/485 protocol, or RS-232 communication with the DB-9 connector).

The mating side view of the cable is, using the RS-232 signal terminology:



Here is the pinout of the CAB9P cable:



where:

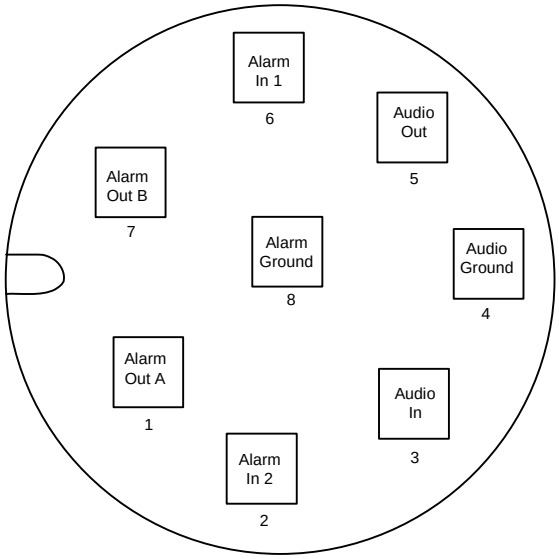
- The RS-422/485 signal terminology is enclosed in parentheses.
- The other wire of each twisted pair is enclosed in square brackets.
- N.C. means *not connected*.

Based on the pinout, the wiring scheme for an RS-232 connection to a computer is:

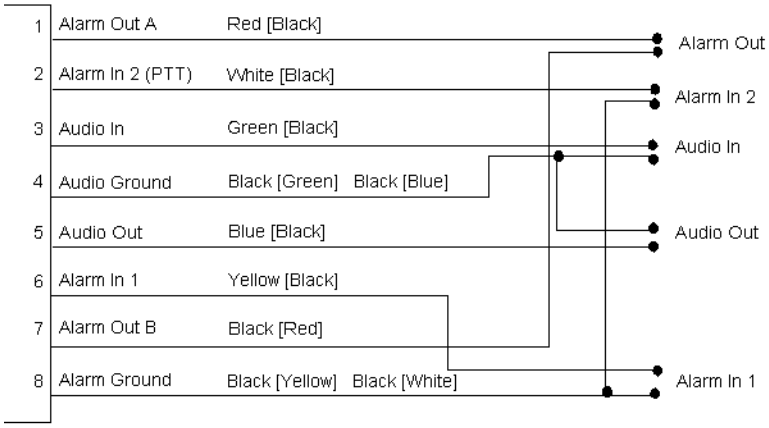
Cable			Computer
Signal name	**Wire pair**	**Wire color**	**Signal name**
CTS	green/black	green	not connected
RxD		black	RxD
TxD	yellow/black	yellow	TxD
RTS		black	not connected
SG	brown/black	brown	SG
SG		black	SG

CAB8P

The CAB8P cable is used for audio and alarms. The mating side view of the cable is:



Here is its pinout:


1 Alarm Out A Red [Black]
2 Alarm In 2 (PTT) White [Black]
3 Audio In Green [Black]
4 Audio Ground Black [Green] Black [Blue]
5 Audio Out Blue [Black]
6 Alarm In 1 Yellow [Black]
7 Alarm Out B Black [Red]
8 Alarm Ground Black [Yellow] Black [White]
Alarm Out
Alarm In 2
Audio In
Audio Out
Alarm In 1
Female mating side

where:

- The other wire of the twisted pair is enclosed in square brackets.

C

DHCP Support and APIPA

DHCP (Dynamic Host Configuration Protocol) allows devices and computers connected to a network to automatically get a valid IP configuration from a dedicated server.

The APIPA (Automatic Private IP Addressing) scheme, available on the Windows operating systems, enables a device to assign itself a temporary IP address.

At startup, an edge device searches for a valid IP network configuration. The device requires this configuration prior to starting its functions. The network configuration for Nextiva devices consists of:

- An IP address
- A subnet mask
- A gateway

The device first looks in its local memory. If no configuration is found, it tries to contact a DHCP server. If DHCP configuration fails—if the device does not find a server or if it cannot get a configuration from it within one minute—the device assigns itself temporary network settings based on the APIPA addressing scheme. This scheme allows a device to find a unique IP address until it receives a complete network configuration, either manually or from a DHCP server.

A device in APIPA mode does not reside on the same subnet as the other devices on the IP network; therefore, it may not be able to see them or be visible to them. Devices use the following temporary APIPA configuration:

- IP address: 169.254. *. *
- Subnet mask: 255.255.0.0
- Gateway: 169.254. *. *

The *. * portion is based on the MAC address of the device.

A device is in APIPA mode:

- The first time it boots up
- After receiving a duplicate IP address
- After a hardware reset
- When the DHCP server does not have any available IP addresses
- After loading the default settings

DHCP configuration is automatically disabled:

- After a firmware upgrade
- After a factory reset

D

DTE and DCE Connections

Before connecting a Nextiva edge device to other RS-232 serial equipment, you need to determine if they are DTE (data terminal equipment) or DCE (data communication equipment).

Here are examples of both equipment types:

- DCE—Nextiva edge devices, modems
- DTE—Computers, switches, multiplexers, cameras, keyboards

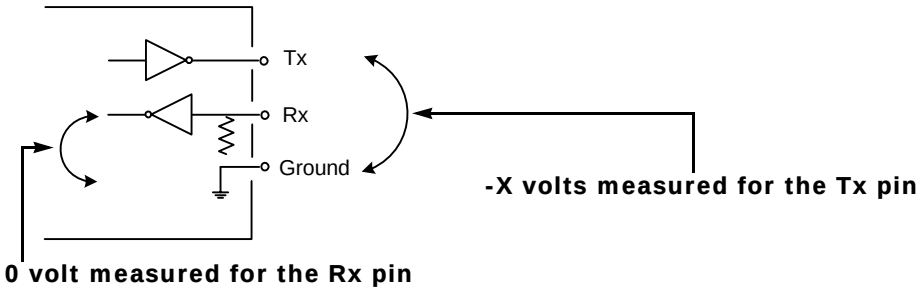
In the following descriptions:

- Voltage is measured when no data is transferred on the Rx and Tx pins.
- *-X volts* represents a negative voltage value.

Data Terminal Equipment

DTE modules have the following electrical-level setup:

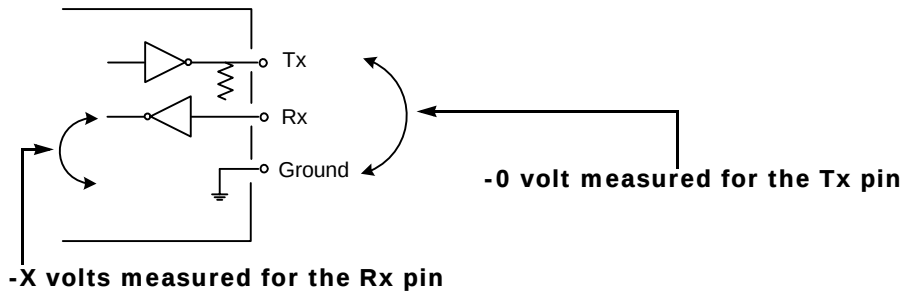
Pin number on the DB9 connector	Signal	Measured voltage
3	Tx	-X volts
2	Rx	0 volt



Data Communication Equipment

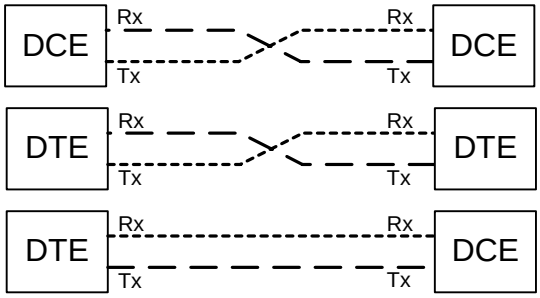
DCE modules have the following electrical-level setup:

Pin number on the DB9 connector	Signal	Measured voltage
3	Tx	0 volt
2	Rx	-X volts



Connecting DTE and DCE

When connecting two modules of the same type, you have to cross the data wires to create proper communication. On the other hand, when connecting a DTE with a DCE, a straight cable is required.



E

Surge Protection

Voltage and current surges can be induced by lightning strikes or power line transients. In the real world, under the right circumstances, these surges can reach sufficiently high levels to damage almost any electronic equipment. Therefore you need to add protection to your devices.

The S1100w provides basic surge protection on all electrical lines. If you are installing the equipment in a lightning prone or heavy lightning environment, or in a site where large AC mains power fluctuations are a common occurrence, Verint strongly recommends that you add additional external surge protection to all vulnerable connections. Vulnerable connections are those that run for a long distance between the S1100w device and the connected equipment.

The video camera is usually within a short distance of the S1100w transmitter; the S1100w interface cable can be routed directly into the camera housing. Therefore, the video line (and the serial port if using a PTZ camera) will seldom need additional protection. The power feed usually runs down the mounting mast or wall for more than 20 feet (7.6 meters); it is a good candidate for additional protection in a surge prone environment. This protection will benefit both the camera and the device.

Excellent international sources for external surge protection equipment and general surge and lightning protection information are:

- Polyphaser Corporation—www.polyphaser.com
- Citel inc.—www.citelprotection.com
- Transtector—www.transtector.com

For the curious mind, a surge protector helps to clamp the surge to safe levels and divert its energy to the earthing point, preventing device damage. Experienced installers know that an effective surge protection must be installed with proper earthing and grounding.

F

Separation Between Devices Using Adjacent Channels

Wireless interference can occur between wireless cells using adjacent frequency channels (for example, channels 149 and 153 in the 5 GHz band). Therefore, it is preferable to avoid using adjacent channels. However, if your setup requires you to, you must follow specific guidelines regarding minimum distances between antennas and signal level margin.

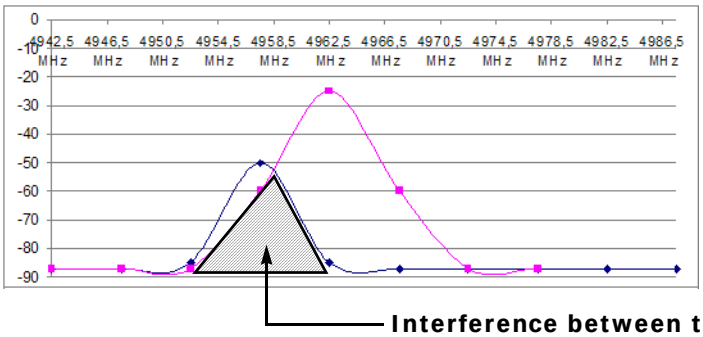
Note: In the 2.4 GHz band, the adjacent channel term applies only to the three independent channels (1, 6, and 11).

If using adjacent frequency channels in a non-DFS environment, you should respect guidelines relative to the minimum separation between device antennas, to avoid interference.

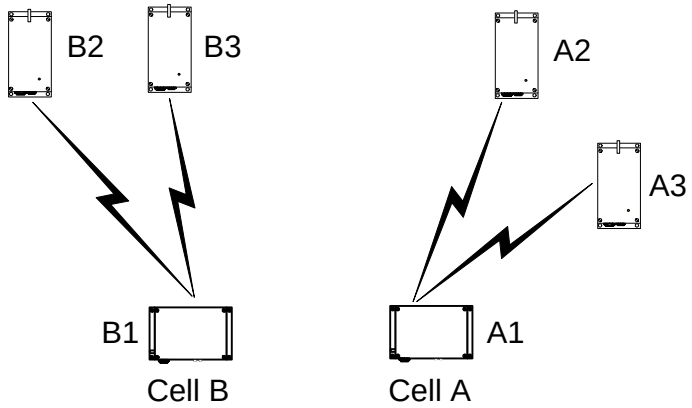
To reduce radio interference possibilities between two adjacent channels, you should ensure that the maximum margin between the emission of the two wireless cells is 25 dB. To meet this objective, perform a site survey and apply minimum distance guidelines.

Performing a Site Survey

The difference in signal level between two adjacent cells must be less than or equal to 25 dB. If this margin is higher than 25 dB, there will be too much interference in the two adjacent wireless cells. To calculate this margin, you need to perform a site survey; for more information, see page 49. Here is an example of a 25 dB margin between channels 8 and 9 in the 4.9 GHz band:



Consider the following setup in the 4.9 GHz band with 5-MHz bandwidth, where Cell B uses channel 6 and you are trying to add Cell A on channel 3 (adjacent to channel 6):



To determine if this setup is feasible, you need to conduct a site survey on device A1 (the master device in Cell A), then calculate the margin between the two cells. During the site survey, device A1 will find the other five devices. With the provided signal levels, you need to check if S2 - S1 <= 25 dB, where:

- S1 is the lowest signal level in the wireless cell of the device performing the site survey (A1 in the example).
- S2 is the highest signal level in the adjacent cell (Cell B in the example).

To calculate the emission margin between two adjacent wireless cells:

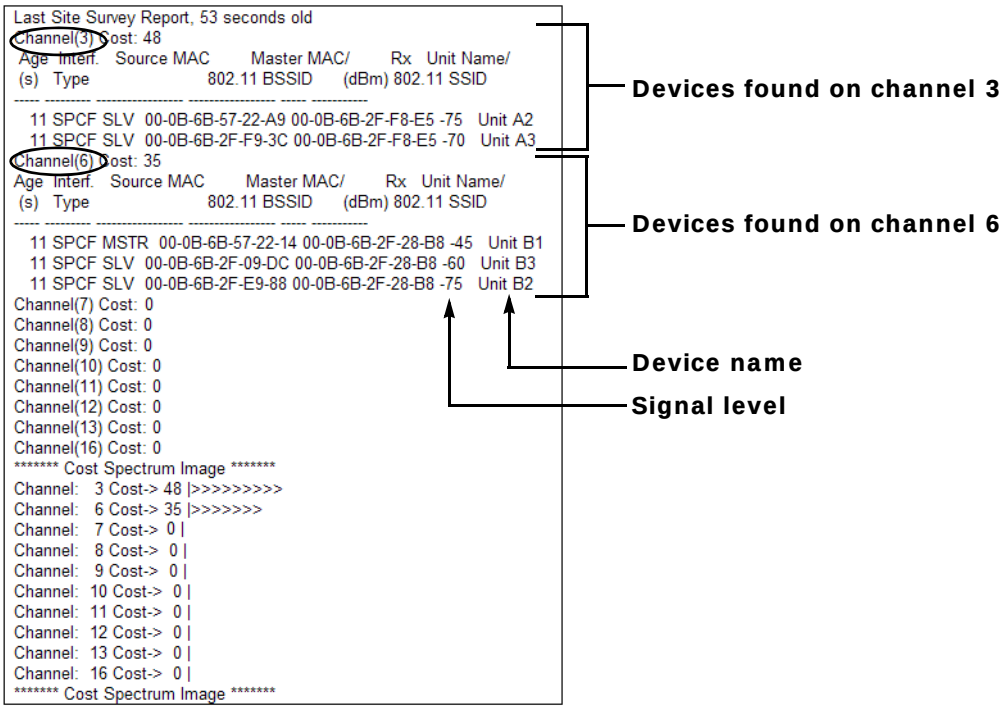
1. Open SConfigurator, then go to the **Units** tab.
2. Select the master device in the wireless cell you are adding, then click **Telnet**.
3. From the main menu of the command line interface (CLI), choose **Advanced > Communication Status and Statistics > Wireless Status**, then press **Enter**.

```
************************************************************
Advanced \ Communication Status and Statistics \ Wireless Status
------------------------------------------------------------
Parameters:
    NIC Name                     : AT5006X DCMA-82 A,B,G 2.4,4.9,5.x GHz
    NIC MAC Address              : 00-0B-6B-2F-F8-E5
    Current Channel              : 7 (4950 MHz) 20 MHz channel bandwidth
    Current TX Rate              : 6 Mb/s
    Current RX Rate              : 6 Mb/s
    Average Signal Level         : -65 dBm
    Current SCF Connection Status: Connected to 1 Client and 1 Slave

    RF Communication Quality     : N/A
    RF Margin                    : N/A
    Current EIRP                 : 34 dBm
    Maximum EIRP allowed         : 42 dBm
    Indoor/Outdoor RF Regulation : Indoor/Outdoor FCCA FCC1
 1) Site survey iteration        : 1

Commands:
l) Display link(s) Info
s) Start/Stop Site Survey
v) Visualize Last Site Survey Report
r) Reset Site Survey data base
p) Previous Menu
************************************************************
```

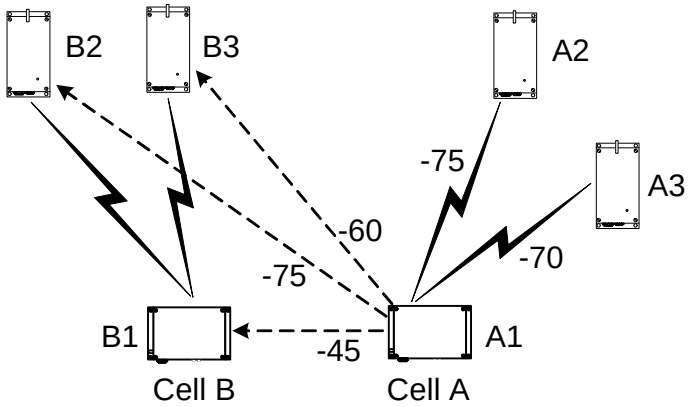
4. For a thorough scan, specify 60 site survey iterations.
5. Start the site survey operation.

   Note: During the execution, the RF link will be momentarily broken (duration varies depending on the number of iterations). The link is automatically restored when the survey is finished.

6. When the survey is complete, visualize the report. For example:


Last Site Survey Report, 53 seconds old
Channel(3) Cost: 48
Age (s) Interf. Type Source MAC 802.11 BSSID Master MAC/ Rx (dBm) Unit Name/ 802.11 SSID
11 SPCF SLV 00-0B-6B-57-22-A9 00-0B-6B-2F-F8-E5 -75 Unit A2
11 SPCF SLV 00-0B-6B-2F-F9-3C 00-0B-6B-2F-F8-E5 -70 Unit A3
Channel(6) Cost: 35
Age (s) Interf. Type Source MAC 802.11 BSSID Master MAC/ Rx (dBm) Unit Name/ 802.11 SSID
11 SPCF MSTR 00-0B-6B-57-22-14 00-0B-6B-2F-28-B8 -45 Unit B1
11 SPCF SLV 00-0B-6B-2F-09-DC 00-0B-6B-2F-28-B8 -60 Unit B3
11 SPCF SLV 00-0B-6B-2F-E9-88 00-0B-6B-2F-28-B8 -75 Unit B2
Channel(7) Cost: 0
Channel(8) Cost: 0
Channel(9) Cost: 0
Channel(10) Cost: 0
Channel(11) Cost: 0
Channel(12) Cost: 0
Channel(13) Cost: 0
Channel(16) Cost: 0
******* Cost Spectrum Image *******
Channel: 3 Cost-> 48 |>>>>>>>>>
Channel: 6 Cost-> 35 |>>>>>>>
Channel: 7 Cost-> 0 |
Channel: 8 Cost-> 0 |
Channel: 9 Cost-> 0 |
Channel: 10 Cost-> 0 |
Channel: 11 Cost-> 0 |
Channel: 12 Cost-> 0 |
Channel: 13 Cost-> 0 |
Channel: 16 Cost-> 0 |
******* Cost Spectrum Image *******
Devices found on channel 3
Devices found on channel 6
Device name
Signal level

This report provides the signal levels between device A1 and the other five devices in the network.



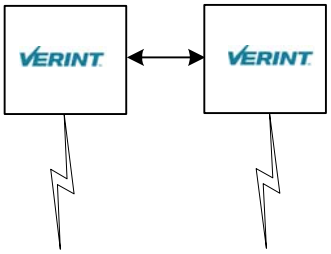
The lowest signal in Cell A is -75 (S1) and the highest signal in Cell B is -45 (S2). The result of S2 - S1 (-45 - -75) is 30. Since the margin is higher than 25 dB, there will be interference issues.

Minimum Distances

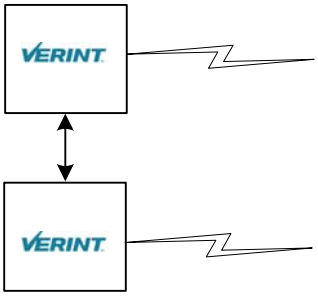
To respect the 25 dB margin between two adjacent channels, in addition to performing a site survey, you can use guidelines relative to minimum distances between the wireless devices. By respecting them, you can assume that there will not be radio interference between the devices.

Three physical setups are covered:

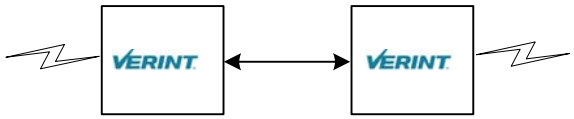
Side by side:



On top:



Back to back:



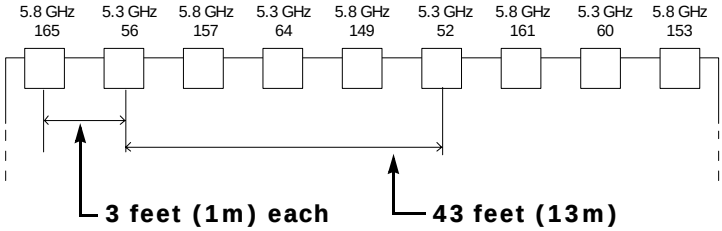
The minimum separation between devices using adjacent channels is:

Setup	5 GHz (13-dBi antenna with 40° beam width)	4.9 GHz (13-dBi antenna with 40° beam width)	2.4 GHz (8.5-dBi antenna with 60° beam width)
Side by side	43 feet (13m)	36.1 feet (11m)	55.8 feet (17m)
On top	13 feet (4m)	6.6 feet (2m)	6.2 feet (1.9m)
Back to back	7.8 feet (2.4m)	13.1 feet (4m)	15.7 feet (4.8m)

If you are using other antennas with narrower beam widths, the distances may be reduced. For assistance, contact the Verint Video Intelligence Solutions Support group.

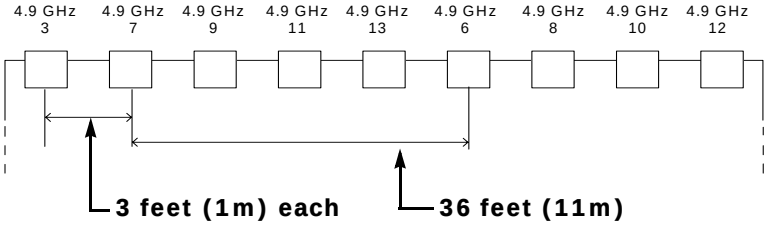
The following deployment scenarios respect these limitations:

- Using only 5 GHz channels, all on the same side of a building:



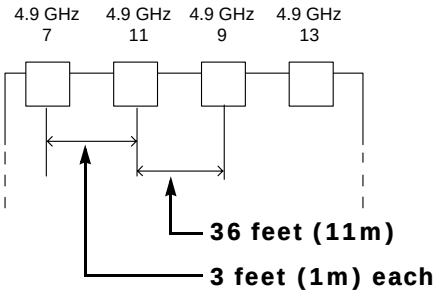
  Notice that the devices using the adjacent channels 52 and 56 are separated by the prescribed 43 feet (13m). However, you can intersperse other devices in-between, as long as they do not use adjacent channels. This way, you can increase the device density without encountering interference problems.

- In the 4.9 GHz band, using only 5 MHz channels, all on the same side of a building:



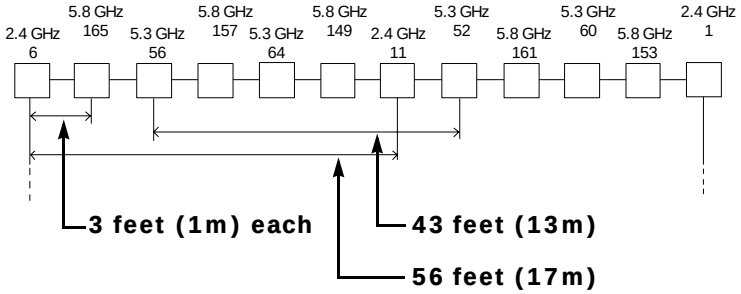
  Notice that the devices using the adjacent channels 7 and 6 are separated by the prescribed 36 feet (11m). However, you can intersperse other devices in-between, as long as they do not use adjacent channels. This way, you can increase the device density without encountering interference problems.

- In the 4.9 GHz band, using only 10 MHz channels, all on the same side of a building:



  Since only four channels are available, it is unavoidable that two adjacent channels are positioned next to each other.

- Using 5 GHz and 2.4 GHz channels, all on the same side of a building:



The devices using the adjacent channels 6 and 11 in the 2.4 GHz are separated by the prescribed 56 feet (17m).

G

DFS and False Radar Detection

Nextiva wireless devices operating in the European Union must adhere to the Dynamic Frequency Selection (DFS) standard; this standard forces any RF transmitter to change frequency channels if radar activity is detected on the current operating channel. If two colocated wireless cells are communicating on adjacent channels, it is possible that the interference between the two systems causes false radar detections. This side-effect is a well-known industry-wide problem. New features in the wireless devices help minimize the occurrence of false detection events.

To avoid false radar detection caused by an adjacent channel, the signal level of an potential interfering device on the first adjacent channel must not exceed -50 dB, -36 dB on the second channel, and -32 dB on the third channel; for example, if you use channel 100, 104 is the first adjacent channel, 108 the second channel, and 112 is the third channel.

The design of wireless systems in a DFS context becomes difficult because not only can the master devices cause an interference, but the clients and slaves on an adjacent channel can also generate interferences that can cause false radar detection. There should be a reduced number of cells available to limit the amount of possible false radar detections; it is strongly suggested to limit the number of colocated cells to six.

The new features that help reduce the possibility of false detection events are:

- Half Channel Selection

  This new parameter of the command line interface (CLI) eliminates the possibility of using adjacent channels. Enable this feature on all masters (S3100, S1100-R) in a new installation to avoid the potential conflict of having two masters on adjacent channels. By default this feature is disabled.

  If this option is enabled, the channel list becomes:

  100(DFS), 108(DFS), 116(DFS), 124(DFS), 132(DFS), 140(DFS), 254(Auto DFS/TPC)

  The full channel list is:

  100(DFS), 104(DFS), 108(DFS), 112(DFS), 116(DFS), 120(DFS), 124(DFS), 128(DFS), 132(DFS), 136(DFS), 140(DFS), 254(Auto DFS/TPC)

  In the CLI: Wireless Communication > Advanced Wireless Setup > DFS/TPC Adjacent Channel Removal

- Slave Radar Detection Management

  A new CLI parameter allows you to disable radar detection on slave or client devices, therefore reducing the number of nodes that can detect radars. In a typical DFS environment, the slave or client can detect a radar and alert its master to change the frequency channel. This situation can cause a major problem because it increases the number of nodes that can detect radars.

  The default value is Disabled, meaning that the slave/client does not detect radars; in this case, the slave/client EIRP is reduced from 30 to 23 dBm.

  In the CLI: Wireless Communication > Advanced Wireless Setup > Enable Radar Detection on Slave

- Manual Channel Selection

  You can now select the initial frequency channel that will be used by the master, with SConfigurator or the CLI. This new feature does not disable radar detection on master devices. This process will still take place and if a radar is detected, the device will go through the regular DFS process (stop transmission on the channel, block this channel for 30 minutes, and select a new channel in the available channel list).

H

S1100w Technical Specifications

Here are the S1100w technical specifications:

Network	RF interface	Proprietary SPCF, 802.11
	Modulation	OFDM
	Encryption	128-bit AES
	Data rate (max. burst rate)	6, 9, 12, 18, 24, 36, 48, and 54 Mbps
	Protocols	Transport: RTP/IP, UDP/IP, TCP/IP, multicast IP Others: DNS and DHCP client, HTTP 1.1 (web server)
Video	Compression	MPEG-4-based
	Frame rate	NTSC: 1–30 fps programmable, 60 fields per second PAL: 1–25 fps programmable, 50 fields per second
	Input	1 composite, 1 Vpp into 75 ohms (NTSC/PAL)
Serial Port	Operating mode	Transparent: supports any asynchronous PTZ serial protocol
	Electrical level	Autolevel sensing RS-232 or RS-422/485
Alarm and Audio	Alarm input	2 dry contact inputs (1 mA max.)
	Alarm output	1 relay contact output (up to 48V at 100 mA)
	Bidirectional audio	Input: -20 to -3 dBV into 30 kohm Output: -45 to -3 dBV into 8 ohms min.
Power	Input voltage	24V AC +/- 10% 12V DC +/- 10% (optional)
	Consumption	28 VA at 24V AC 12W (970 mA at 12V DC)
Physical	Enclosure	NEMA 4X/IP 66 powder coat painted die-cast aluminum with wall mounting brackets
	Size	9.0L x 3.9W x 3.8H inches (230L x 100W x 96H mm)
	Weight	3.6 lb (1.65 kg)
	Environment	-22ºF to 122ºF (-30ºC to 50ºC)
	Humidity	100% at 122°F (50°C)
Certification / Regulation	USA	FCC part 15 (subparts B and E)
	Canada	Industry Canada RSS-210, RSS-139, and ICES-003
	Europe	CE marked EN 300 328-2 V1.2.1 (2001-12) EN 301 893 V1.2.3 (2003-08) EN 301 489-01 V1.4.1 (2002-08) EN 301 489-17 V1.2.1 (2002-08) EN 60950:2000 Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 (RoHS)

Glossary

This glossary is common to the Nextiva line of edge device products.

Access Point A communication hub for connecting wireless edge devices (S1100w) to a wired LAN. The Nextiva access point is the S3100 product.

AES (Advanced Encryption Standard) An encryption standard used in the WPA2 authentication method.

APIPA (Automatic Private IP Addressing) A feature of Windows-based operating systems that enables a device to automatically assign itself an IP address when there is no Dynamic Host Configuration Protocol (DHCP) server available to perform that function. Also known as *AutoIP*.

Bridge See *Wireless Bridge*.

Camera, IP See *S2500e*, *S2600e Series*, or *S2700e Series*.

CCTV (cLosed Circuit Television) A television system in which signals are not publicly distributed; cameras are connected to television monitors in a limited area such as a store, an office building, or on a college campus. CCTV is commonly used in surveillance systems.

CIF (Common Intermediate Format) A video format that easily supports both NTSC and PAL signals. Many CIF flavors are available, including CIF, QCIF, 2CIF, and 4CIF. Each flavor corresponds to a specific number of lines and columns per video frame.

CLI (command line interface) A textual user interface in which the user responds to a prompt by typing a command.

Codec (Coder/Decoder) A device that encodes or decodes a signal.

Configuration Assistant A proprietary graphical program used to configure and update the firmware of the S1100 edge devices.

DCE (Data Communication Equipment) In an RS-232 communication channel, a device that connects to the RS-232 interface. Nextiva edge devices and modems are DCE.

Decoder See *Receiver*.

DHCP (Dynamic Host Configuration Protocol) A communication protocol that lets network administrators manage centrally and automate the assignment of Internet Protocol (IP) addresses in a network.

DTE (Data Terminal Equipment) In an RS-232 communication channel, the device to which the RS-232 interface connects. Computers, switches, multiplexers, cameras, and keyboards are DTE.

DVR (Digital Video Recorder) A device (usually a computer) that acts like a VCR in that it has the ability to record and play back video images. The DVR takes the feed from a camera and records it into a digital format on a storage device which is most commonly the hard drive.

Edge Device A Nextiva device transmitting or receiving video signals through an IP network. The devices can be wireless or wired; some transmitters are IP cameras.

Encoder See *Transmitter*.

Ethernet A local area network (LAN) architecture using a bus or star topology and supporting data transfer rates of 10, 100, and 1000 Mbps. It is one of the most widely implemented LAN standards. The 802.11 protocols are often referred to as “wireless Ethernet.”

Firmware Software stored in read-only memory (ROM) or programmable ROM (PROM), therefore becoming a permanent part of a computing device.

IP (Internet Protocol) The network layer for the TCP/IP protocol suite widely used on Ethernet networks.

IP Camera See *S2500e*, *S2600e Series*, or *S2700e Series*.

LAN (Local Area Network) A computer network that spans a relatively small area. A LAN can connect workstations, personal computers, and surveillance equipment (like edge devices). See also *WAN*.

MPEG-4 A graphics and video lossy compression algorithm standard that is derived from MPEG-1, MPEG-2, and H.263. MPEG-4 extends these earlier algorithms with synthesis of speech and video, fractal compression, computer visualization, and artificial intelligence-based image processing techniques.

Multicast Communication between a sender and multiple receivers on a network; the devices can be located across multiple subnets, but not through the Internet. Multicast is a set of protocols using UDP/IP for transport.

Multiport S17XXe Series The series of wired video transmitters designed for a variety of video monitoring and surveillance applications in which a high concentration of cameras terminates within the same area. The transmitters in the series offer 4, 8, 12, or 24 video inputs. Some models offer onboard video analytics capabilities.

nDVR A video management and storage software sold by Verint. This graphical product is used in conjunction with wired and wireless edge devices.

Nextiva The powerful, enterprise-class video management platform and suite of applications from Verint that helps enhance security and improve performance. Nextiva simplifies the management of large scale, distributed video operations and promotes efficient use of network resources.

NTSC (National Television Standards Committee) The North American standard (525-line interlaced raster-scanned video) for the generation, transmission, and reception of television signals. In addition to North America, the NTSC standard is used in Central America, a number of South American countries, and some Asian countries, including Japan. Compare with *PAL*.

NTP (Network Time Protocol) A protocol designed to synchronize the clocks of devices over a network.

OSD (On-screen Display) Status information displayed on the video monitor connected to a receiver edge device.

PAL (Phase Alternation by Line) A television signal standard (625 lines) used in the United Kingdom, much of western Europe, several South American countries, some Middle East and Asian countries, several African countries, Australia, New Zealand, and other Pacific island countries. Compare with *NTSC*.

PEAP (Protected Extensible Authentication Protocol)—A method to securely transmit authentication information, including passwords, over a wireless network.

PSK (Pre-Shared Key) A mode of the WPA and WPA2 security protocols, designed for home and small office networks that cannot afford the cost and complexity of an authentication server. It is also known as *personal mode*.

PTL (Push-To-Listen) In a two-way system, the communication mode in which the listener must push a button while listening.

PTT (push-To-Talk) In a two-way system, the communication mode in which the talker must push a button while talking.

PTZ Camera (Pan-Tilt-Zoom) An electronic camera that can be rotated left, right, up, or down as well as zoomed in to get a magnified view of an object or area. A PTZ camera monitors a larger area than a fixed camera.

QoS (Quality of Service) A set of low-level networking protocols giving higher priority to more important data flows while ensuring that the less important ones do not fail.

Receiver A device converting a digital video signal into an analog form. Also called *decoder*.

Repeater A range extender for wireless links. The Nextiva repeater is the S3100-RP product, made up of two devices.

RF (Radio Frequency) Any frequency within the electromagnetic spectrum associated with radio wave propagation. When a modulated signal is supplied to an antenna, an electromagnetic field is created that is able to propagate through space. Many wireless technologies are based on RF field propagation.

RS-232 A standard interface approved by the Electronic Industries Alliance (EIA) for connecting serial devices.

RS-422 A standard interface approved by the Electronic Industries Alliance (EIA) for connecting serial devices, designed to replace the older RS-232 standard because it supports higher data rates and greater immunity to electrical interference.

RS-485 An Electronics Industry Alliance (EIA) standard for multipoint communications.

S1100 The series of secure outdoor wireless video systems (one receiver and one transmitter per system) covering the 2.4 and 5 GHz bands in North America and Europe, and the public safety 4.9 GHz band in North America.

S1100w The outdoor wireless video transmitter covering the 2.4 and 5 GHz bands in North America and Europe, and the public safety 4.9 GHz band in North America.

S1500e Series The series of wired edge devices (receivers and transmitters) designed for video monitoring and surveillance over IP networks. The transmitters in the series offer from one to eight video inputs; the series proposes two receivers with one and four video outputs.

S1700e Series The series of wired video transmitters designed for video monitoring and surveillance over IP networks, offering DVD-quality video and power over Ethernet. The transmitter in the series offers one video input and web access.

S17XXe Series (Multiport) The series of wired video transmitters designed for a variety of video monitoring and surveillance applications in which a high concentration of cameras terminates within the same area. The transmitters in the series offer 4, 8, 12, or 24 video inputs. Some models offer onboard video analytics capabilities.

S1900e Series The highly compact, single-input video transmitter designed for video monitoring and surveillance over IP networks, offering various video qualities and functionality sets, as well as web access for configuration and live viewing. The series includes one receiver, the S1970e-R (displaying up to four video streams), and three transmitters, the S1900e-AS (with onboard analytics capabilities), the S1950e (a cost optimized solution), and the S1970e (for better video performance).

S1900e-Vicon The board holding the S1900e compact IP technology, to be included into Vicon SurveyorVFT dome cameras.

S2500e The MPEG-4-compliant professional IP camera integrating a video sensor and an Ethernet encoder in the same compact enclosure.

S2600e Series The set of professional IP cameras with a super wide range for excellent quality in high-contrast environments. These MPEG-4-compliant cameras integrate a video sensor and an Ethernet encoder in the same compact enclosure. The series includes color, day/night, and analytics-ready cameras. All models provide web access for configuration and live viewing.

S2700e Series The set of high-resolution, IP mini-dome cameras with triple axis lens rotation for flexible installation, and low lux sensitivity for crisp clear images in a variety of lighting conditions. The S2700e cameras offer DVD-quality video and web access for configuration and live viewing. The models are separate for NTSC and PAL; for each video standard, there are two models: indoor and vandal-resistant.

S3100 Series The set of multipurpose outdoor, wireless, digital video products. The series includes the S3100 (for access point systems), S3100-BR (for wireless bridge applications), and S3100-RP (for point-to-point, point-to-multipoint, and wireless bridge repeaters). The S3100 series covers the 2.4 and 5 GHz bands in North America and Europe, and the public safety 4.9 GHz band in North America

SConfigurator A proprietary graphical program used to configure and update the firmware of edge devices.

Serial Port An interface that can be used for serial communication, in which only one bit is transmitted at a time. A serial port is a general-purpose interface that can be used for almost any type of device.

SSL (Secure Sockets Layer) A commonly used protocol for transmitting private documents via the Internet. SSL works by using a public key to encrypt data that is transferred over the SSL connection. The SSL protocol secures the following data: I/O, serial port, and VSIP communication; it does not apply to audio and video transmission.

TKIP (Temporal Key Integrity Protocol)—A security protocol used in the WPA authentication method.

TLS (Transport Layer Security)—A cryptographic protocol that provide secure communications on a wireless network.

Transceiver (Transmitter/Receiver) A device that both transmits and receives analog or digital signals.

Transmitter A device sending video signals captured with a connected camera to a receiver. The transmitter converts the analog signal into a digital form before transmitting it. Also called *encoder*.

TTLS (Tunneled Transport Layer Security)—A cryptographic protocol that creates a secure TLS tunnel.

VSIP (Video Services over IP) A proprietary communication protocol for sending messages between a computer and a Nextiva edge device, or between two devices.

WAN (Wide Area Network) A computer network that spans a relatively large geographical area. Typically, a WAN consists of two or more local area networks (LANs).

WEP (Wired Equivalent Privacy) A security protocol for wireless local area networks (WLANs) defined in the 802.11b standard. It is designed to afford wireless networks the same level of protection as a comparable wired network.

Wireless Bridge A link between two networks, wired or wireless. The Nextiva wireless bridge is the S3100-BR product, made up of two devices.

Wireless Cell A group of wireless devices that communicate together on the same radio frequency channel and share the same wireless passkey.

Wireless Transmission A technology in which electronic devices send information to receivers using radio waves rather than wiring.

WPA (Wi-Fi Protected Access version 1) An authentication method to secure wireless systems. It is the successor of WEP. WPA implements the majority of the IEEE 802.11i standard.

WPA2 (Wi-Fi Protected Access version 2) An authentication method that implements the full 802.11i standard, but will not work with some older network cards. It is also known as *802.11i*.

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Compliance

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the effective isotropic radiated power (EIRP) is not more than that required for successful communication.

Note: The S1100w devices require professional installation. They should be installed in a location that would prevent the general population from approaching from 3 feet (1 meter) of the radiating element.

USA

The FCC IDs are VKHCM9S1100S3100 and NKRDCMA82.

This device complies with parts 15 and 90 of the FCC (Federal Communications Commission) rules (see http://www.fcc.gov/).

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation of the device.

This equipment has been tested and found to comply with the limits for Class B Digital Device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in residential installation. This equipment generates and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the S1100w device
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Any changes or modifications not expressly approved by Verint Systems Inc. could void the user's authority to operate the equipment.

Canada

The IC ID is 7286A-CM9S1100.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

Italia

L'uso di questo apparato in Italia è regolamentato da:

- D.Lgs 1.8.2003, n.259, articoli 104 (attività soggette ad autorizzazione generale) e 105 (libero uso), per uso privato;
- D.M. 28.5.03, per la fornitura al pubblico dell'accesso alle reti e ai servizi di telecomunicazioni (R-LAN or R-LAN and Hiperlan).

Europe

Declaration of Conformity

Manufacturer:

Verint Systems Inc.
1800 Berlier
Laval, Québec
H7L 4S4
Canada

Declares under sole responsibility that the product:

Product name: Wireless video transmitter
Model number: S1100w

To which this declaration relates is in conformity with the following standards or other documents:

R&TTE Directive 1999/5/EC

EN 300 328-2 V1.2.1 (2001-12)
EN 301 893 V1.3.1
EN 301 489-01 V1.4.1 (2002-08)
EN 301 489-17 V1.2.1 (2002-08)
EN 60950:2000

Verint hereby declares that the equipment specified above conforms to the above Directive(s) and Standard(s).

May 6th, 2004
Laval, Canada

For the official signed declaration of conformity, visit http://www.verint.com/video_solutions/section2a.cfm?article_level2_category_id=17&article_level2a_id=289.

Turkey

Declaration of Conformity

Manufacturer:

Verint Systems Inc.
1800 Berlier
Laval, Québec
H7L 4S4
Canada

Declares under sole responsibility that the product:

Product name: Wireless video transmitter
Model number: S1100w

To which this declaration relates is in conformity with the following standards or other documents:

R&TTE Directive 1999/5/EC

EN 300 328-2 V1.2.1 (2001-12)
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EN 301 489-17 V1.2.1 (2002-08)
EN 60950:2000

Verint hereby declares that the equipment specified above conforms to the above Directive(s) and Standard(s).

December 14th, 2004
Laval, Canada

For the official signed declaration of conformity, visit http://www.verint.com/video_solutions/section2a.cfm?article_level2_category_id=17&article_level2a_id=289.

RoHS Declaration of Compliance

June 14th, 2006

Verint believes in the importance of conducting our business in a manner that will help protect the environment as well as our employees, customers, and the public.

To that end, we are committed to bringing our existing and future product lines into EU RoHS Directive compliance.

Thus, as of July 1 2006, the following product, S1100w, will comply with the DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 (RoHS) regarding the restriction of the use of certain hazardous substances in electrical and electronic equipment.

The S1100w product will not exceed the maximum concentrations of 0.1% by weight in homogenous materials for lead, hex chrome, mercury, PBB, PBDE, and 0.01% for cadmium. In addition, the S1100w product will qualify for the “lead in servers solders” exemption as set forth in the Directive.

This declaration is provided based on reasonable inquiry of our suppliers and represents our actual knowledge based on the information provided by our suppliers.

VERINT

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AMERICAS

info@verint.com

www.verint.com/videosolutions

EMEA

marketing.emea@verint.com

www.verint.com/videosolutions

APAC

marketing.apac@verint.com

www.verint.com/videosolutions